SOUTHERN POWER AND INDUSTRY

Ad Index, page 176 : OCTOBER, 1951

In This Issue

88 CASE STUDIES

Showing how production is being improved in Southern and Southwestern plants through better planning and improved use of modern equipment.

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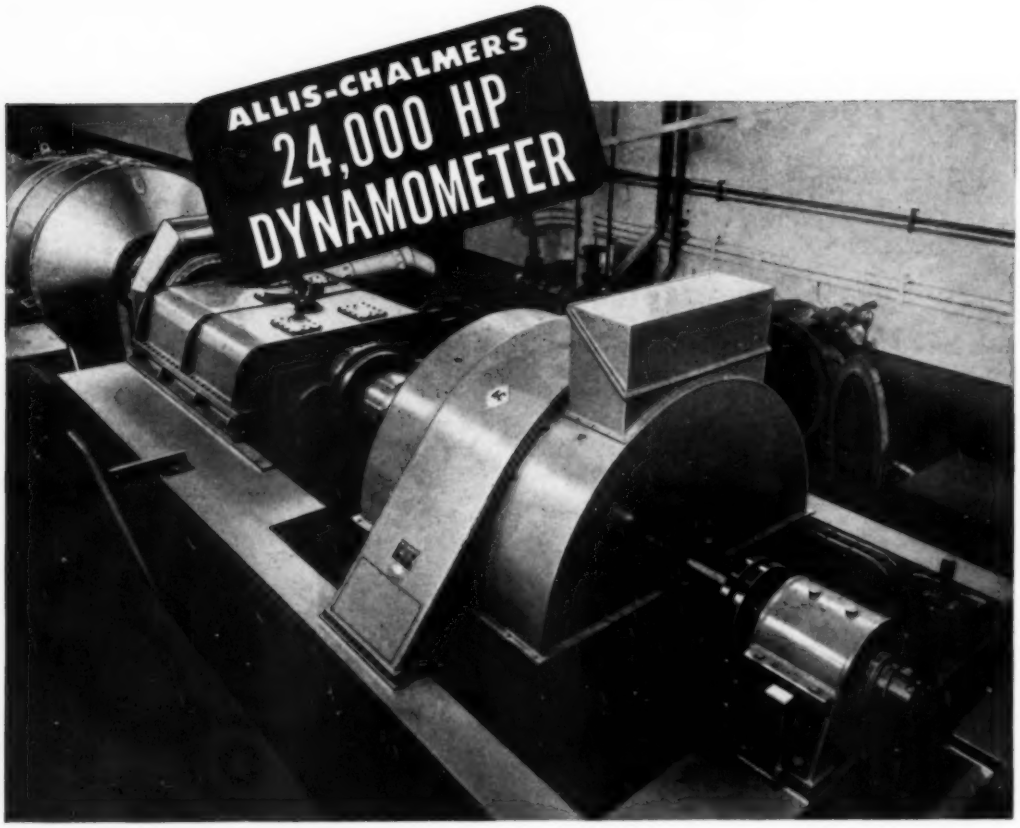
Annual

Better Production

Issue



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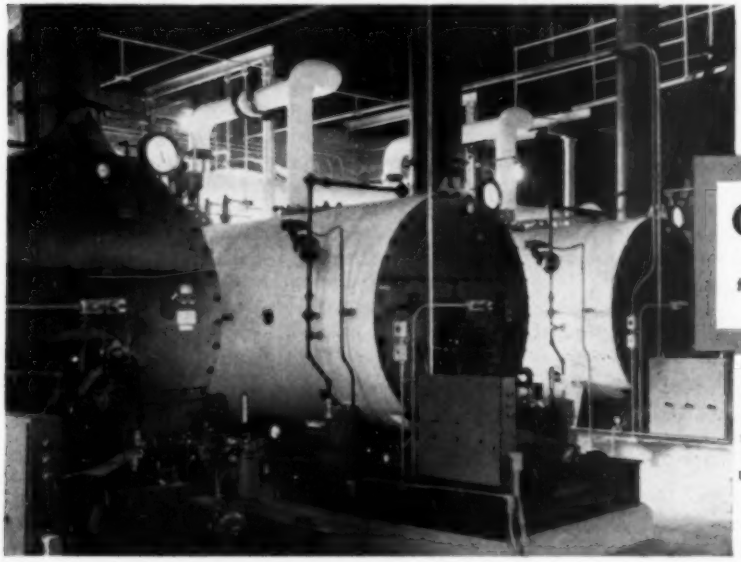

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SOUTHERN POWER AND INDUSTRY

Vol. 69
No. 10

OCTOBER 1951

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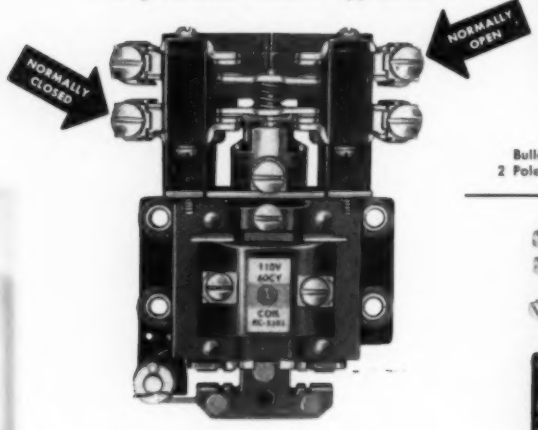
Editorial and Executive Offices: **SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E., ATLANTA 5, GEORGIA**

Over 1,000,000 ALLEN-BRADLEY RELAYS

in precision control applications



Ten hundred thousand relays are a lot of relays . . . all at work on machine tools and other responsible jobs . . . that's the success story of Allen-Bradley Bulletin 700 Solenoid Relays since they were introduced, eighteen years ago. Ask about them . . . anywhere . . . and you will find Bulletin 700 Solenoid Relays are dependable . . . accurate . . . consistent . . . long lived . . . and trouble free.

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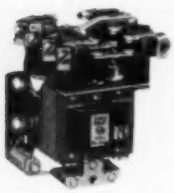

Bulletin 700—Type BM 200, 2 Pole Mechanically held Relay.

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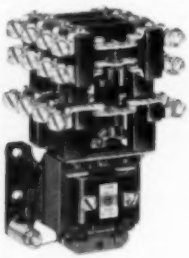
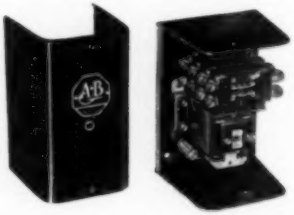


Bulletin 700—Type BX 840, 8 Pole Universal Solenoid Relay.

Bulletin 700—Type BX 440, 4 Pole Universal Solenoid Relay.



Bulletin 700 Relays are available in NEMA Type 1, 4, and 7 enclosures, or without enclosures for mounting on special control panels.

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Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

October, 1951

THIS OCTOBER '51 VOLUME is the Fourth Annual BETTER PRODUCTION issue of SP&I. Many short articles are presented showing what specific Southern and Southwestern industrial and power plants are doing to increase output and improve performance. Many of these plant tested procedures and improvements can be copied and put to work toward increasing production in your own plant.

The many BETTER PRODUCTION case histories presented are necessarily brief. Emphasis is concentrated on direct information—need and objectives, description of improvements and results. For more detail on these plant case histories—equipment or evaluation of results—plant engineers can direct their inquiries either to the manufacturer specified or to the Editors. In either case, identify the equipment or plant with the case number of the item.

INDUSTRY MET THE EMERGENCY in the recent Kansas City flood disaster. Brief digest of emergency measures utilized in cleaning up the mud-fouled and water damaged property or equipment is carried in the News section. Materially aiding the operations were the Caterpillar Tractor Company sending into the area eighteen Diesel tractors equipped with Traxcavators and bulldozers. Other Caterpillar equipment, such as Diesel electric sets, were put to work providing emergency light and power.

Westinghouse Electric Corporation set up an emergency repair depot in its huge jet-engine plant and brought in repair specialists from eleven cities. The Homestead Valve Manufacturing Company of Coraopolis, Penna., shipped 150 Hypressure Jenny Steam Cleaners into the city to help in cleaning and disinfecting operations, and many other manufacturers of equipment were active in relieving distress and helping flooded plants back to operation.

ALCOA'S $80 MILLION LIGNITE-FUELED aluminum reduction plant, scheduled for construction near Waco, Texas, was announced in the September issue of SP&I. In the new Bureau of Mines process, lignite is finely ground and pressure-treated at high temperature in a hydrogen atmosphere. Resulting reaction, somewhat similar to catalytic cracking of petroleum, breaks the lignite down into oil and a combustible residue. The oil is being eyed by petrochemical firms as a source of aromatic fractions.

The Bulletin of the Arkansas Economic Council emphasizes that Arkansas has extensive lignite deposits in at least six counties. Lignite, or brown coal, is a young coal in which the alteration of vegetable material has proceeded farther than in peat, but not as far as in high-volatile bituminous coal. Reserves in one 60 sq mile area in Quachita County, Arkansas, are estimated at 75 million tons.

This Bureau of Mines process is believed by the Arkansas Economic Council to have opened up a new vista in industrial power production. Lignite can be cheaply strip-mined with power shovels and low cost is seen as a competitive threat to coal and fuel oil for large operations.

VAPOR-COOLED, VAPOR-INSULATED TRANSFORMERS are expected to be 1/4 to 1/3 lighter than liquid-immersed units of equivalent rating and performance. Cooling technique by Westinghouse utilizes heat of vaporization of liquid fluorocarbons for cooling and dielectric strength of

fluorocarbon vapor for insulating. Two units have been constructed and another is being installed on a large utility system.

Here's how it works—Fluorocarbon is sprayed uniformly over core and coils. Liquid evaporates taking heat for its vaporization from the coils. Fluorocarbon vapor fills space in tank, insulating transformer parts. Vapor is forced upward through cooling tubes and as it condenses, condensate flows by gravity back to sump.

CASH IT IN NOW—Scrap in your plant will bring high prices. It is urgently needed to keep the steel mills going at full capacity to meet the needs of industry. This is serious business. The steel mills must have more scrap—and NOW. Otherwise, output will drop and all steel users will suffer.

Old, replaced machinery and equipment, rails, structural parts and other "heavy" scrap are needed mostly. But metalworking waste—turnings, borings, punchings, crop ends, etc.— is also needed.

REMEMBER THE NEG'ATOR, developed in 1949 by Hunter Spring Company? It is a spring-like device which works in reverse—RESISTS LESS THE MORE IT IS DEFORMED. It has enormous expandability and range of action (up to 50 times any original dimension) and the ability to act around corners or through small openings. The Neg'ator is now used as a mechanical counterweight in X-ray machines, window sashes, sewing machines, venetian blinds, and liquid level indicators.

Latest application is Neg'ator fluorescent lighting fixtures which can be serviced at floor level. Units can be drawn from any operating height to remain stationary at a convenient level. Current is automatically disconnected from each fixture as it is lowered. Counterbalancing of The Thompson Electric Company's fixture is provided in minimum space by two Neg'ators mounted in fixture housing.

MAGNETIC AMPLIFIERS will control a Southeastern paper mill's large high-speed winder drive, which will handle heavy 234 in. wide kraft board at operating speeds up to 5000 fpm. The amplifiers will perform control functions formerly obtained by the use of rotating regulators or electronic equipment. They will provide voltage regulation of the system and current-limit control during acceleration and deceleration of the winder, as well as constant-tension regulation of the braking generator with provision for inertia compensation.

The magnetic amplifier is a static device, consisting of electric coils on an iron core, something like a transformer. It has no bearings, commutator, brushes, or electronic tubes, reducing control maintenance to a minimum.

MAJOR INDUSTRIAL EXPANSIONS OF THE MONTH—metals refining plant by Federated metals division of AMERICAN SMELTING & REFINING CO. on 30 acre site in BIRMINGHAM . . . $27 million expansion at ST. JOE PAPER CO., PORT ST. JOE, FLORIDA . . . $25 million, 500 ton-a-day kraft pulp, board and paper mill by NATIONAL CONTAINER at VALDOSTA, GEORGIA . . . multi-million dollar paperboard plant at JESUP, GEORGIA by MENGEL CO. . . . $5 million chemical plant at CALVERT CITY, KENTUCKY by B. F. GOODRICH CHEMICAL CO.

BABCOCK & WILCOX have $2 million plus plant scheduled for WEST POINT, MISSISSIPPI and expanded use of subcontracted facilities at WILMINGTON, DEL., WILMINGTON, N. C. and DALLAS, TEXAS . . . $14 million SPENCER CHEMICAL COMPANY anhydrous ammonia operation for VICKSBURG, MISSISSIPPI.

$45,000 expansion of paperboard facilities at CHAMPION PAPER & FIBRE at HOUSTON, TEXAS . . . 255 acre site at ARLINGTON, TEXAS acquired by GENERAL MOTORS for B. O. P. assembly plant . . . $2 million roofing plant at IRVING, TEXAS by THE LLOYD A. FRY ROOFING CO.

Write the editors for additional information on any of the above items.
SOUTHERN POWER & INDUSTRY 806 Peachtree St., N.E. Atlanta 5, Ga.

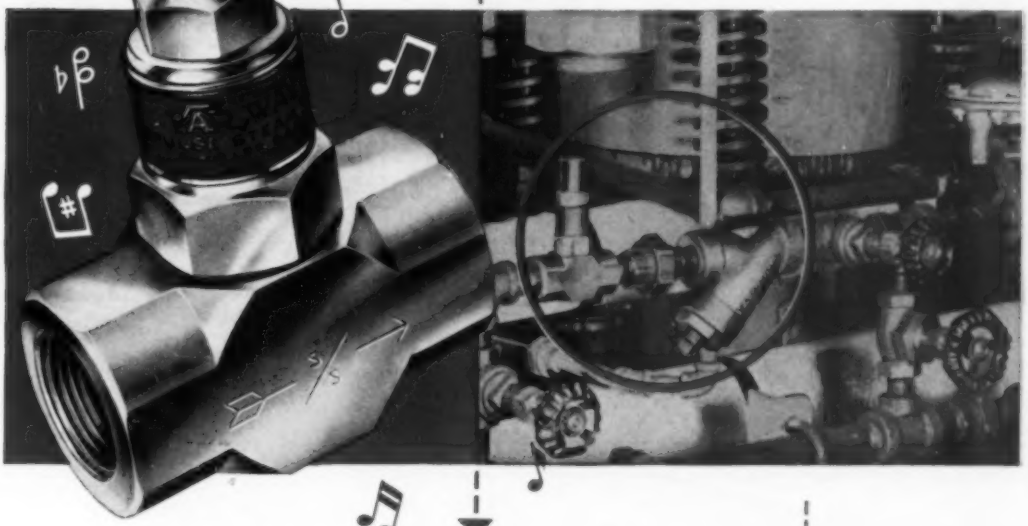
---

hot presses make sweet music

If a 30% increase in production sounds like sweet music to you—keep your ear tuned to this story.

One of the largest manufacturers of phonograph records recently relocated 60 of their record presses, and also equipped each one with a ½" Yarway Impulse Steam Trap and Strainer. What happened? A 30% increase in record production . . . plus a decision to equip all 130 presses in the plant with Yarways.

It's another example of how these Yarway Impulse Traps can help increase production by sending the most premium B.T.U.'s at top temperatures into your product or process. In plant after plant, *they get equipment hotter, sooner and keep it hot.*



Other Yarway features—small size, easy hook-up, one moving part, low upkeep, stainless steel construction and low cost. Nearly 750,000 Yarway Impulse Steam Traps have already been installed.

It's always convenient to buy Yarway Traps and Strainers. One of the 216 industrial distributors who stock and sell them is located near you.

For his name, and a free copy of the new, helpful 24-page Yarway Steam Trap Catalog write—

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the steam trap designed with more production in mind

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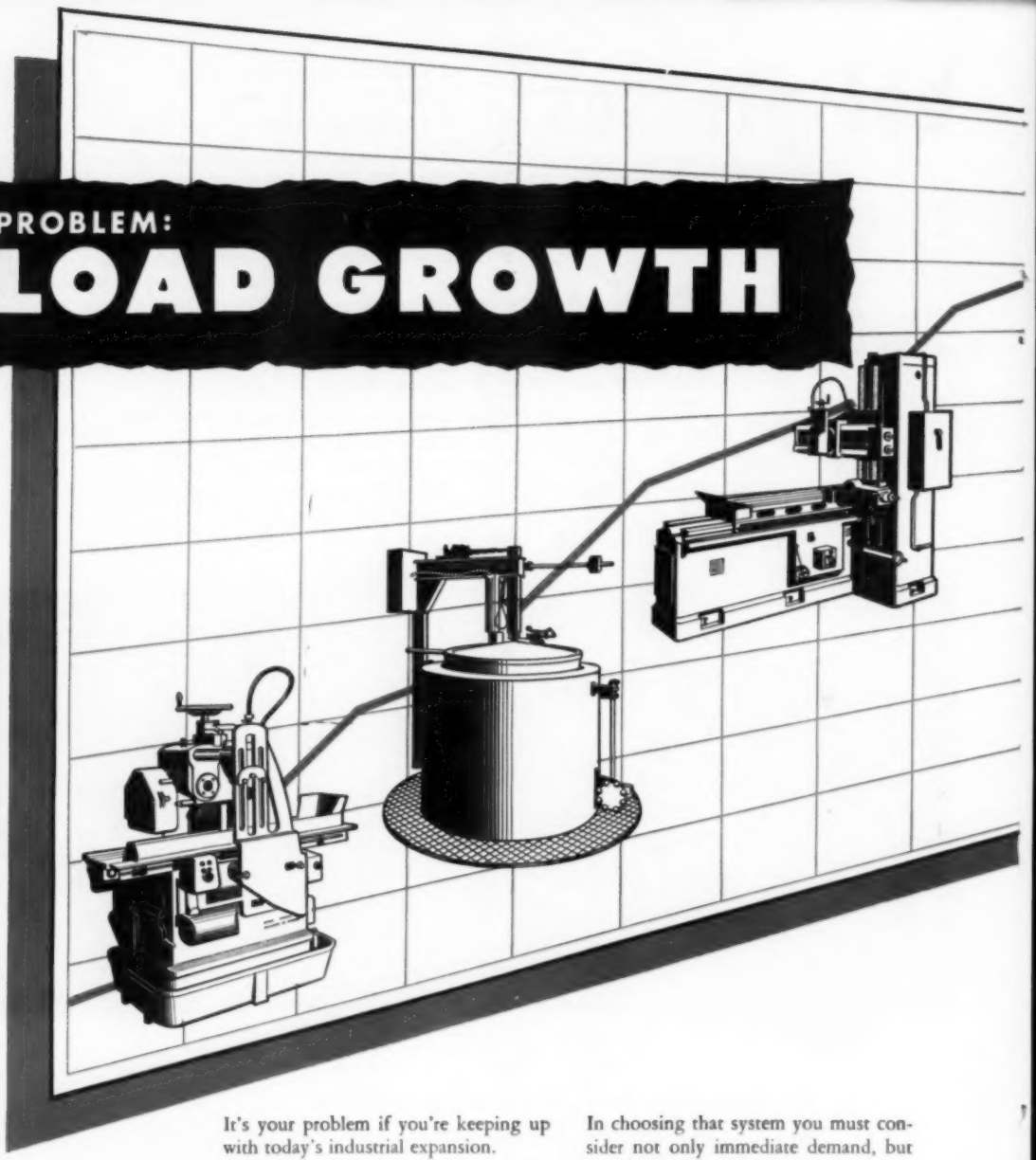
Southern Representative: ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.



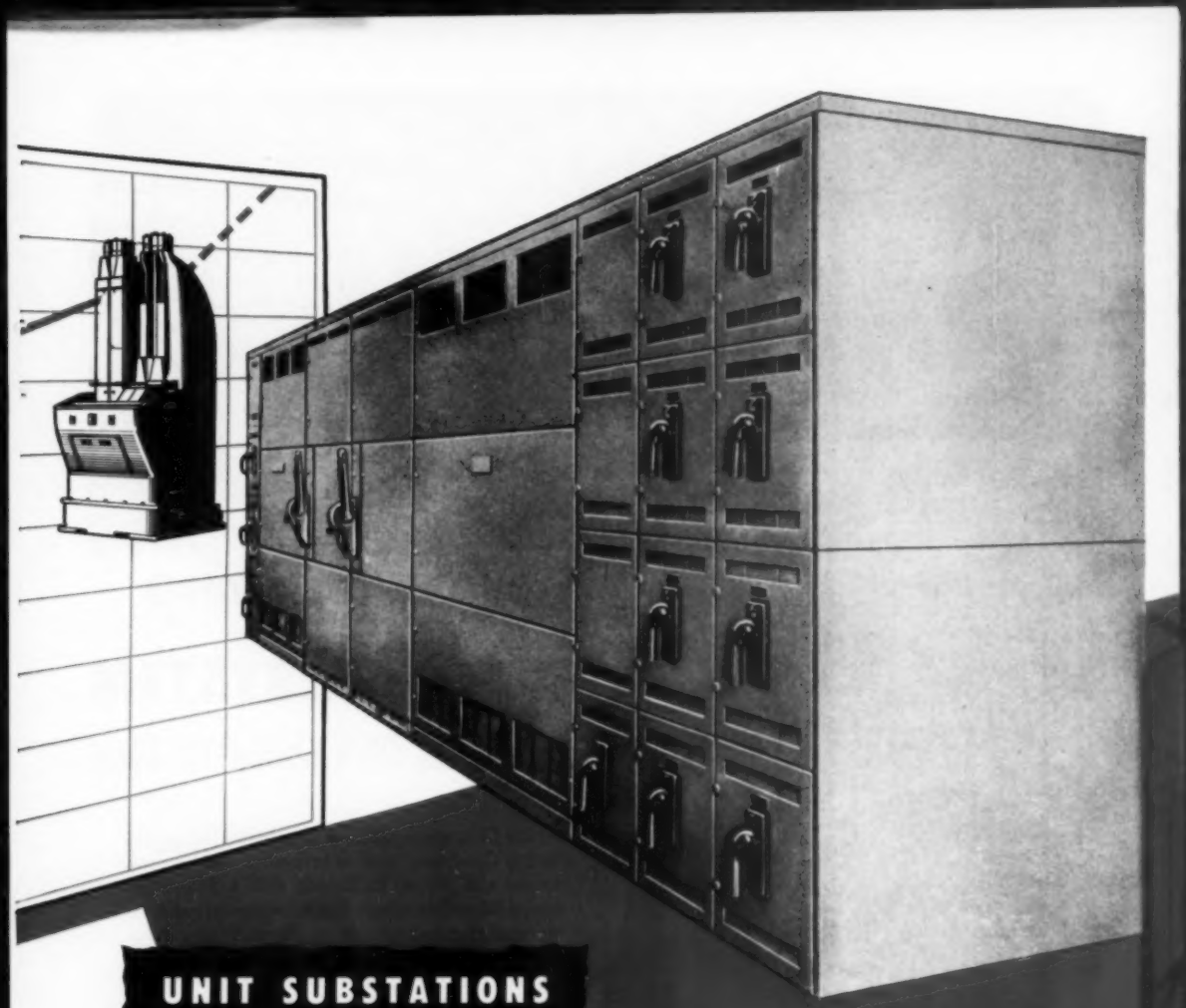
It's your problem if you're keeping up with today's industrial expansion.

And when new production machinery adds load upon load to your electrical system, your planning naturally includes installation of a unit substation system.

In choosing that system you must consider not only immediate demand, but also future expansion. The system must be designed and engineered to meet your specific requirements, flexible enough to be expanded for future needs.

THE ANSWER: I-T-E UNIT SUBSTATIONS!

I-T-E Catalog 9000 describes all types of secondary unit substation equipment, offers concise, easy-to-use information on selection of distribution systems and equipment. One page alone, on cost comparison of basic power distribution systems, may save you weeks of investigation and reduce initial investment. Send for Catalog 9000. I-T-E Circuit Breaker Company, 19th and Hamilton Sts., Philadelphia 30, Pa. Subsidiaries: Railway and Industrial Engineering Co., Greensburg, Pa.; Eastern Power Devices, Ltd., Toronto.

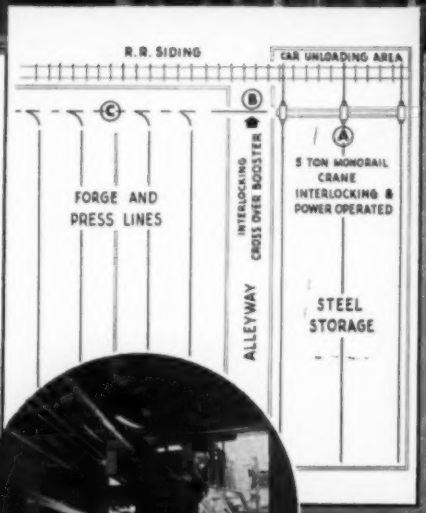


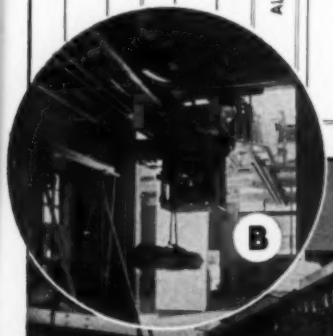
UNIT SUBSTATIONS

Here is a typical I-T-E indoor unit substation with air cooled transformers. Substation arrangement puts primary load break interrupter switches and transformers in the center. As load grows, addition of low voltage switchgear to either end is simple and inexpensive.

Uniform appearance of the structure and symmetry of enclosing panels are consistent with the operating excellence of I-T-E switchgear.

The I-T-E Company





Interlocking

MONORAIL SYSTEM

Solves Steel Distribution Problem

At the Columbus plant of The Jeffrey Manufacturing Company, steel is unloaded from cars or trucks and placed in storage with a 5-ton high speed MonoRail crane. Stock is transferred from storage to press and forge shops by the same crane with carrier transfer across interlocking booster between storage and shops. Steel is distributed in shops by means of finger-tip control power operated MonoRail carrier.

The solution of this problem is made possible by extended hook coverage across interlocking tracks between buildings.

For similar problems, an American MonoRail engineer is available. Send letterhead request for copy of our new 264-page catalog, showing complete line of MonoRail equipment for engineer's use.

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- ✓ Better Heat Recovery
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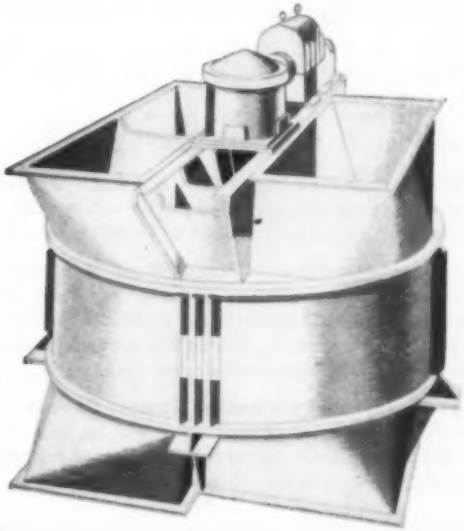
The Ljungstrom operates on the continuous regenerative counterflow principle. The heat transfer surfaces in the rotor act as heat accumulators. As the rotor revolves the heat is transferred from the waste gases to the incoming cold air.

If you want to improve the combustion of low-grade fuels . . . raise the level of heat recovery . . . conserve critical materials in plant design . . . you or your consultants can make profitable use of Preheater experience. Let our specialists tell you more about the Ljungstrom Air Preheater, and the outstanding job it has done for hundreds of America's leading industries and public utilities, where the need for preheated air from 300F to approximately 1200F was part of their problem. Our engineers are ready to work with you in applying the Ljungstrom to your own heat recovery problem.



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Two CONSECO UNITS Handle
435,000 lb. Feed Water Per Hr.
at this large
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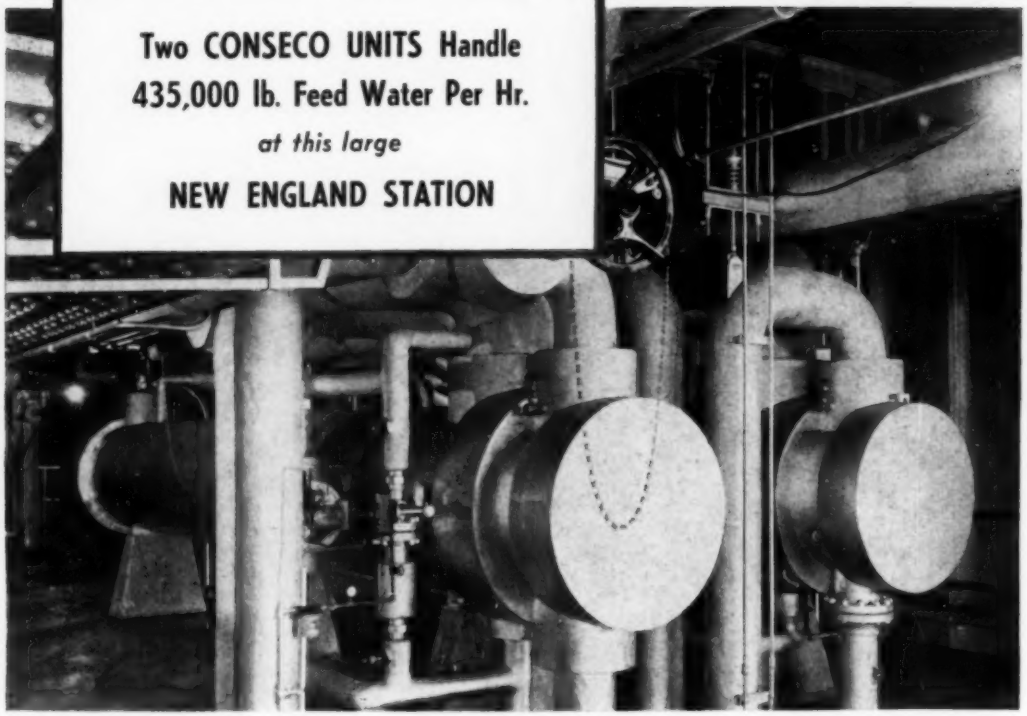

It Will Pay You to Look into These FW Heater Advantages . . .

The two Conseco Feed Water Heaters shown are installed in the central station of a large New England public utility company. Each unit is a low pressure, internal floating head, removable bundle type.

The larger of the two units has 3,000 sq. ft. of surface, uses extraction steam and handles 380,000 lb. of water per hour. The smaller, 2,500 sq. ft. unit, is fitted with an integral drain cooler and handles 435,000 lb. of water per hour, using extraction steam. Liquid level in the drain cooler section is automatically controlled.

May we suggest that you consult Conseco Engineers about your particular feed water heater needs? They will be glad to tell you about the many advanced heater features which assure trouble free, low cost performance in your plant.

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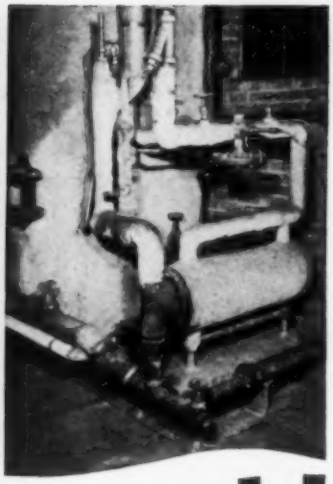
Sarco type TR-30 regulator with needle valve supplies just the right amount of steam to the oil preheater to maintain correct oil temperature at the burner, regardless of load changes or intermittent operation. Efficient burner operation is assured, resulting in a saving in fuel.



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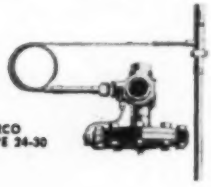

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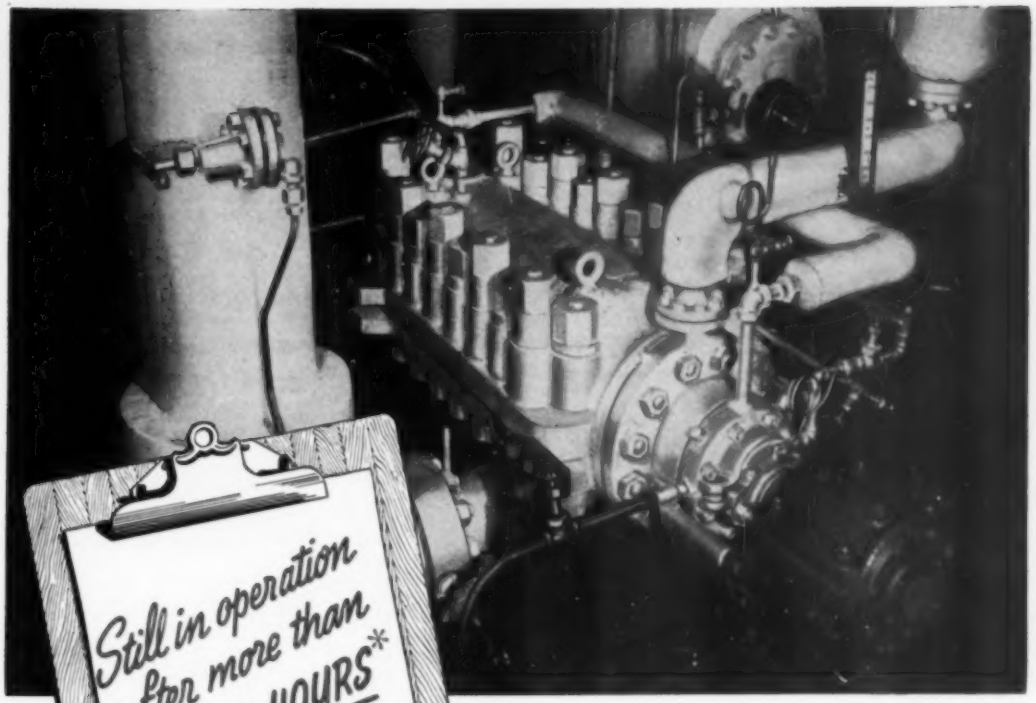

THIS INGERSOLL-RAND Class HT pump No. 7C was installed in 1938 in the Windsor Station. Windsor Station is owned jointly by The Ohio Power Company (American Gas and Electric System) and the West Penn Power Company. Since that time the pump has chalked up a service record of 82,659* hours of operation — pumping rated capacity of 1025 gpm to approximately 1900 psi discharge pressure from suction conditions of 415 psi and 380° F.

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833 **BRONZE BEARINGS FOR MOTORS**—Catalog 240—Gives complete specifications of stock bronze bearings particularly intended for application to electric motors.—THE BUNTING BRASS & BRONZE CO.

840 **MOTOR ACCESSORIES, CONTROLS**—Catalog, 76 pages, gives complete information regarding switches, starters, contactors, speed regulators, and various accessories for electric motors, complete with illustrations, condensed general data, dimensions, prices, etc.—ALLEN-BRADLEY CO.

851 **"FUSEOLOGY"** — Handbook on Fuses—Intended to help maintenance engineers. Tells what to do when fuses blow, where to look for trouble—what to do after trouble is found—how to select the right type for various circuits—how to choose the proper size of fuse or Fusetron. —BUSSMAN MFG. CO.

853 **ELECTRIC CABLE** — Bulletin EP-1527 — Describes Okonite-Okoprene cables, pointing out many advantages from the standpoint of installation, electrical operation, and design. Complete details as to dimensions, engineering data and applications. —THE OKONITE COMPANY.

858 **INDUCTION MOTORS**—Condensed Catalog No. 150M—Dimensions, ratings and prices, from ¼ hp to 2 hp, with complete descriptive information for all types, in accurate and convenient form.—STERLING ELECTRIC MOTORS, INC.

Continued on page 171

10-51-1

Please send me without obligation, free booklets described in the October, 1951, issue of SOUTHERN POWER AND INDUSTRY as circled below:

5	10	20	22	48	57	89	61	64	78	84	96	104	107	120	126
138	141	154	162	164	168	174	200	202	204	214	255	257	258	272	284
311	312	318	319	326	384	387	404	409	410	417	425	443	448	473	483
515	519	546	573	608	611	613	624	680	691	693	704	706	709	714	720
721	766	793	825	828	831	833	840	851	853	858	B1	B2	B3	B4	B5
B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20	B21
B22	B23	B24													

Also send further information on following New Equipment (pages 161-171)

L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16
L17	L18	L19	L20	L21	L22	L23									

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List Items You Want, Tear Out and Mail One of the Attached Cards Now!

Please be sure to fill in your Firm's Name and your position on the Coupon. This service cannot be extended to you unless this information is furnished.

It's Better than ever!

Improved Design

TYPE 2500-259
with fabricated steel float cage...

and the little Brother and Sister

TYPE 2500-249V
for side vessel mounting

TYPE 2500-249P
for top vessel mounting

Accepted everywhere for

- **LIQUID LEVEL CONTROL**
- **LIQUID LEVEL INDICATION**
- **INTER FACE CONTROL**

Yes – it's preferred, because it gives peak performance. The newly designed Fisher Series 2500 Level-Trol combines many improved features to better meet every field service requirement – to provide longer life with ease of maintenance. Write today for Fisher Bulletin F-3.

FISHER

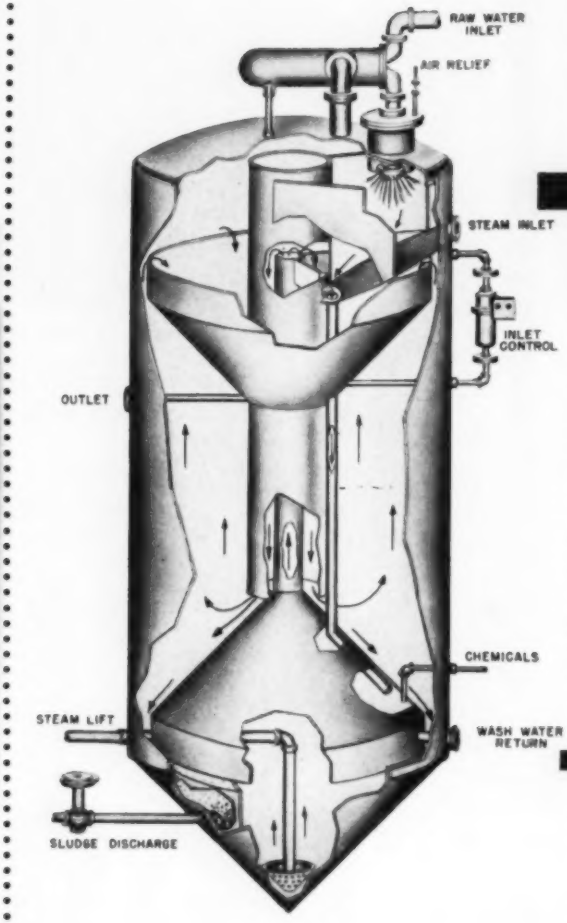
LEVEL-TROL®

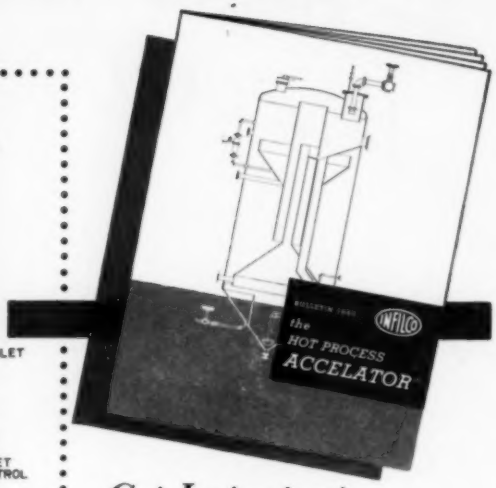
FISHER GOVERNOR COMPANY
Marshalltown, Iowa

FISHER

WORLD LEADER IN THE MANUFACTURE OF LIQUID LEVEL CONTROLLERS, PRESSURE REGULATORS AND IN RESEARCH FOR BETTER CONTROL

Now Ready... bulletin 1855
hot process water treatment





Get Important New Facts on:

1 Chemistry of boiler feedwater treatment
2 Hot Process softening and deaeration
3 Advantages and limitations
4 Accessory equipment
5 Typical installations (including drawings)

SEND NOW FOR INFILCO BULLETIN 1855

Contains data based on 50 years' experience in softening and treating water.

HOT PROCESS

Accelator®

offers self-contained deaeration — controlled slurry recirculation — maximum silica reduction — chemical economy. Fully described in Bulletin 1855

INFILCO

• BETTER WATER CONDITIONING AND WASTE TREATMENT SINCE 1934 •

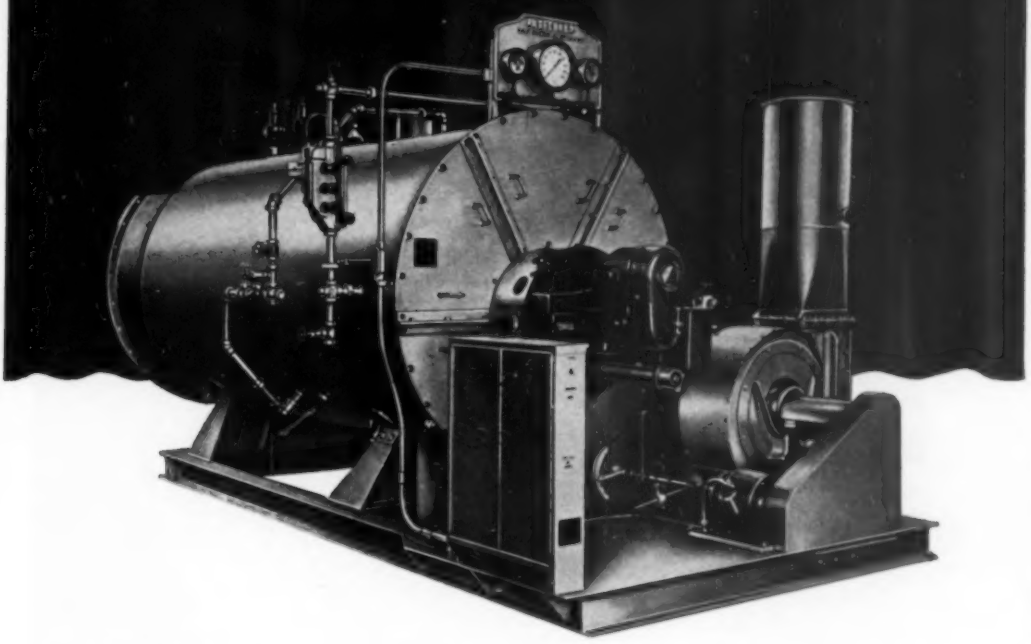
INFILCO INCORPORATED | *Tucson, Arizona*

FIELD ENGINEERING OFFICES IN 26 PRINCIPAL CITIES

World's Leading Manufacturers of Water Conditioning and Waste-Treating Equipment

Still leads the field

PREFERRED UNIT STEAM GENERATOR

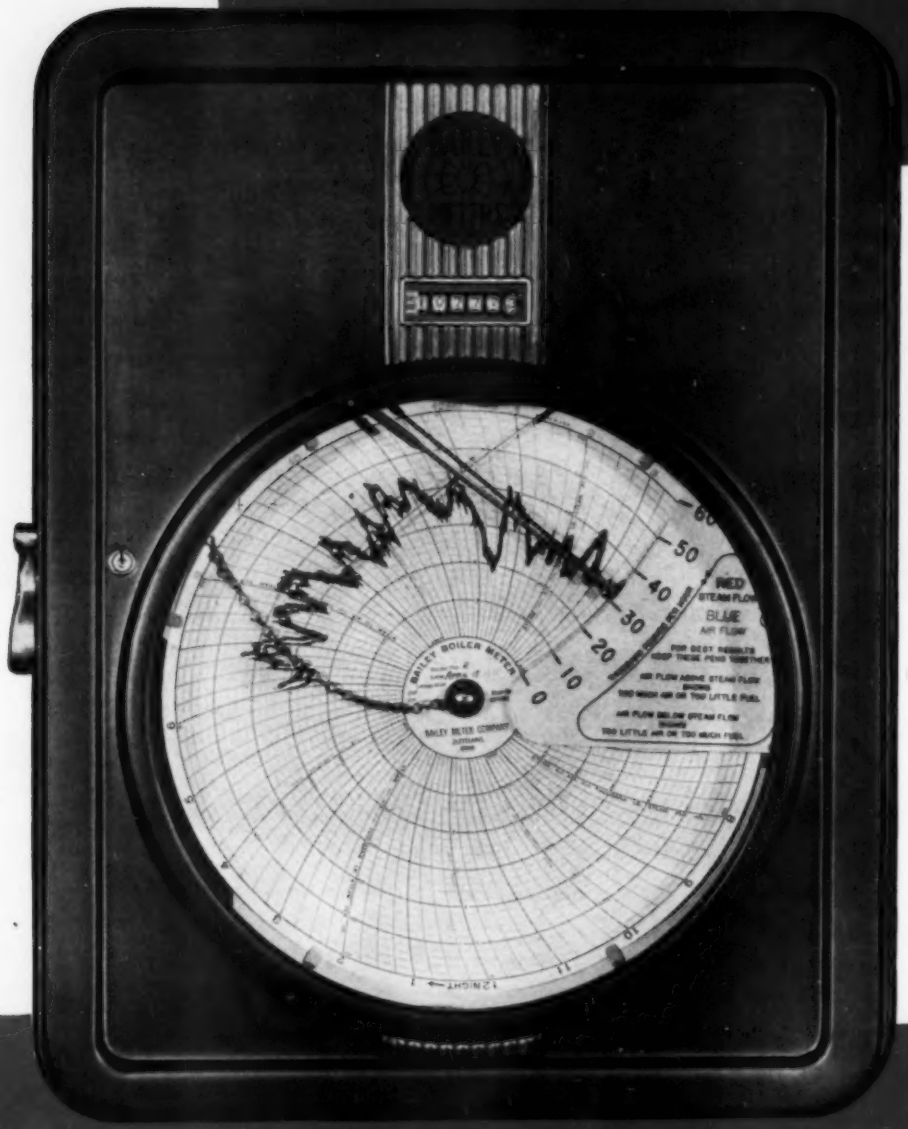


IT'S A FACT—the finest unit steam generator costs the least over its entire life span. That's why Preferred has never lowered the quality of its product to lower the first cost. This accent on progressive engineering not only insures Preferred's leadership in its field, but also gives you—the buyer—true boiler economy • Such features as the anti-stress deck, staggered tube construction and special precipitator are your assurances of at least 25 years of efficient, economical, maintenance-free service at a minimum efficiency of 80%.

Write for bulletin giving complete details.

PREFERRED UTILITIES MANUFACTURING CORP.
1860 BROADWAY, NEW YORK 23, N. Y.

Whatever Fuel



Bailey Controllers of this type accurately measure and record the factors upon which controls are based.

You Burn—You'll Save Money with BAILEY CONTROLS

You'll get high Economy, Safety and Availability because Bailey Controls, working from the accurate measurements of Bailey Meters, do the right thing at the right time.

Bailey Combustion Control

1. Secures instant response to changes in load by regulating both fuel and air at the same time.

2. Maintains optimum fuel-air ratio as measured by Bailey Meters.

3. Gives you the same complete control, when you change fuel, or even when you burn waste.

Bailey Three-element Feed Water Control

1. Reacts quickly and yet retains high stability by accurately measuring Steam Output and Feed Water Input and by controlling the rate of feed water input so that it equals steam output.

2. Surge resulting from severe load changes is held to a minimum by the action of flow ratio and level components which may be adjusted to conform with boiler characteristics and operating conditions.

3. Needs no excess pressure control because its operation is based in part on an accurate measurement of feed water input.

4. Power used by feed pumps may be reduced by applying Three-element Feed Water Control directly to pump speed.

Bailey Steam Temperature Control

Maintains uniform temperature by controlling primarily from boiler load and by readjusting from temperature.

Bailey Feed Heater Control

1. Gives smooth efficient flow through heaters because its multi-element action incorporates accurate measurements of both flow and level.

2. Permits the use of smaller storage capacity heaters and tanks thereby reducing the cost of initial equipment.

Bailey Pump By-Pass Control

Protects pumps by opening a by-pass valve when flow through the pump drops below the safe minimum value.

BAILEY METER COMPANY

1028 IVANHOE ROAD • • • CLEVELAND 10, OHIO

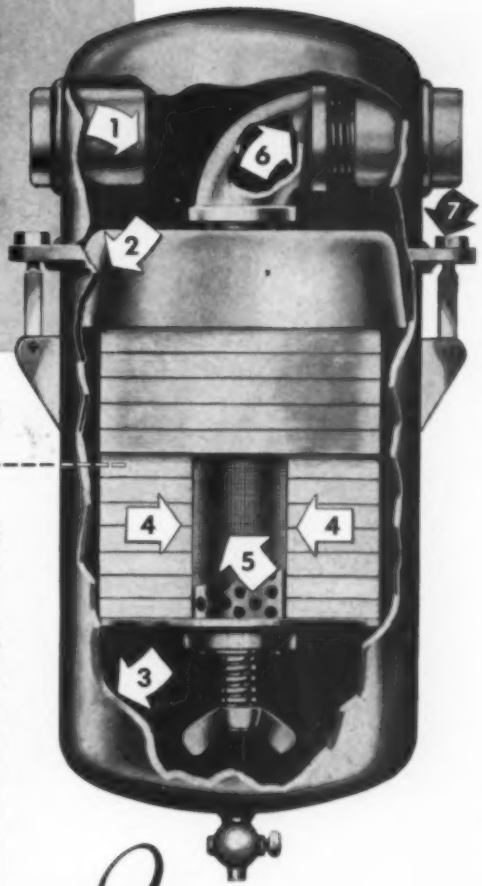
Controls for Steam Plants

COMBUSTION • PRESSURE
FEED WATER • LIQUID LEVEL
TEMPERATURE • FEED PUMPS

A-00

Here's why your plant needs a
GAI-TRONICS
Power Plant Communication System
...custom-built by Power Plant Design-Engineers!
EFFICIENCY! Everyday-operations run smoother because a modern GAI-TRONICS System is fast and sure. Critical manpower is used most effectively. Executives, operators, departments, and maintenance men are called by name instead of by slow, confusing code calls. Two-way or group conversations take place over special telephone handsets. These are designed for noise-free operation in extremely high noise areas even without acoustic booths! GAI-TRONICS has proved itself in the plants of many electric utilities throughout the United States and abroad.
EMERGENCY! When trouble occurs, a GAI-TRONICS System alerts and coordinates all affected areas by voice at once—even though the system is otherwise in operation. All areas can hear all sides of emergency instructions, if necessary, or telephone-type privacy may be had at the flick of a switch! Maintenance men can be located and dispatched to the job without delay.
ECONOMY! A GAI-TRONICS System is surprisingly low-priced because it is designed, by men thoroughly acquainted with power plant requirements, to provide all internal communication facilities in one system! By preventing damage to costly plant equipment and keeping your plant "on-the-line" during an emergency, a GAI-TRONICS System may pay for itself in minutes! Fast and sure GAI-TRONICS communication minimizes accidents, misunderstood orders, improves labor relations, and lowers production costs.
FREE ... a booklet or a demonstration! POWER PLANT COMMUNICATION SYSTEMS is an information booklet showing GAI-TRONICS at work under the most difficult sound conditions. Read it before deciding on communications for your plant. It will save you money! If you should like a demonstration . . . we will bring a portable GAI-TRONICS unit to your plant and prove its worth under any noise conditions! Write today!
GAI-TRONICS CORPORATION
GAI
A SUBSIDIARY OF GILBERT ASSOCIATES INCORPORATED
432 WASHINGTON STREET • READING, PENNSYLVANIA

Removes Last Traces of Oil and Moisture from *COMPRESSED AIR LINES*



THICK FELT DISCS PROVIDE SUPER FILTRATION

DOUBLE ACTION PRINCIPLE REMOVES MOISTURE AND DIRT TWO WAYS—Here's the greatest pipe line filter ever developed for removal of every trace of foreign matter, condensed oil and moisture. Compressed air is cleaned by both *mechanical separation* and *filtration/absorption.* Air entering filter inlet (1) strikes Deflector Cup (2) by which heavier droplets of water and dirt particles are directed to sides of Housing (3) and thence downward at high velocity to base where liquid and heavier particles are deposited. The *mechanically cleaned* air then passes at low velocity thru the Discs (4) which *filter* the air and *absorb* the last traces of oil and moisture. Clean, dry air passes out thru fine mesh Bronze Screen (5) and Outlet (6). Swing Bolts (7) on head for easy inspection are optional.

Originally designed for the protection of pneumatically operated control apparatus, these revolutionary filters are now used as a primary or final stage of filtration for an ever-increasing number of tools, devices and processes. Many highly successful installations are reported in which no other filter had proven satisfactory.

Request Bulletin B-1A, mentioning problem involved for specific engineering information. Please direct your inquiry to Dept. 40.

Staynew

ABSORPTION FILTER

A complete range of sizes available, handling capacities from 5 to 100 CFM free air at 80 lbs. gauge pressure in standard pipe sizes from ¼" to 2". Model illustrated is AAPHS (swing-bolt head). Available also is Model AAPH, identical except for bolted-head construction.

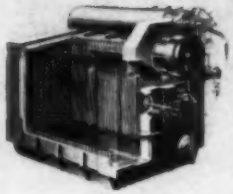
DOLLINGER REG. PROTECTOMOTOR U.S. PAT. OFF. STAYNEW FILTERS

DOLLINGER CORPORATION
11 CENTRE PK., ROCHESTER 3, N. Y.

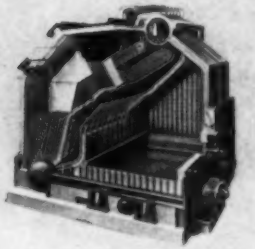
—now

...B&W INTEGRAL-FURNACE

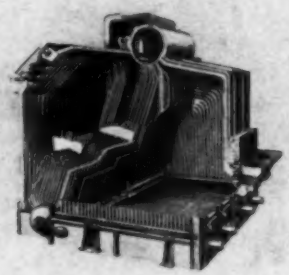
for steam requirements from 2800 to 350,000 lb. per hr.



TYPE FM
(Factory-assembled Unit)



TYPE FF



TYPE FJ

cost-saving features

- Minimum floor space and headroom requirements
- High fuel economy
- Smokeless combustion
- Adaptable to all fuels and firing methods
- Economical fast steaming
- Water-cooled furnace
- Clean, dry steam at all ratings even with high boiler water concentrations
- Quick response to wide and heavy load swing demands
- Easy to inspect and clean
- High availability with least attention

over 167 million lb. of steam per hr. for these industrial, utility, and other users

Abrasives
Airlines
Automotive
Baking
Beverages
Brewing
Building Materials
Candy
Chemicals
Dairy
Distilling
Drugs
Electrical
Electronics
Food
Foundry
Fruit Packing
Glass
Iron & Steel
Laundry
Leather
Lumber
Machinery
Meat Packing
Metal Working
Mining
Non-Ferrous Metals
Oil Refining
Paint
Paper
Plastics
Process
Rubber
Sugar
Textile
Tobacco

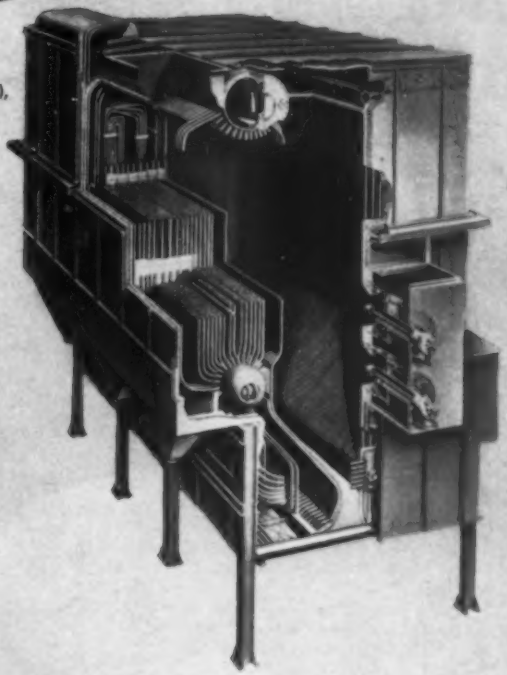
Utilities
Gas Companies
Municipal Plants
Power Plants
Railroads

Others
Colleges
Florists
Hospitals
Hotels
Housing Projects
Institutions
Military Posts
Navy Yards
Office Buildings
Ordnance Plants
Stores

BOILER ADVANTAGES

Examples of B&W Engineering For Economy

TYPE FH
with hopper bottom (as shown), or flat floor



TYPE FL

the B&W integral-furnace BOILER family

TYPE	CAPACITY RANGE LB. STEAM/HR.	PRESSURE PSI	TEMPERATURE	FIRING
FM	2,800- 25,000	15- 275	Saturated	Oil and Gas
FF	8,000- 50,000	160- 600	Superheat	Stoker, Oil, and Gas
FJ	30,000- 70,000	160- 800	Superheat	Stoker, Oil, and Gas
FL	60,000-120,000	160-1050	Superheat	Stoker, Oil, and Gas
FH	50,000-350,000	160-1050	To 910 F	Pulverized, Coal, Oil, and Gas

BABCOCK & WILCOX

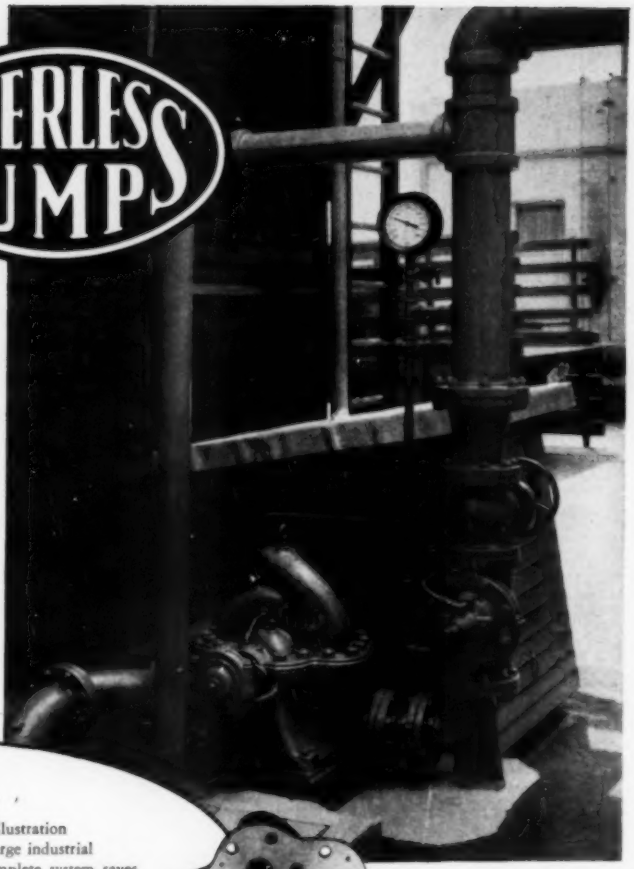
G-522T

PEERLESS Type TU

MULTI-STAGE PUMPS for HOT and COLD LIQUIDS

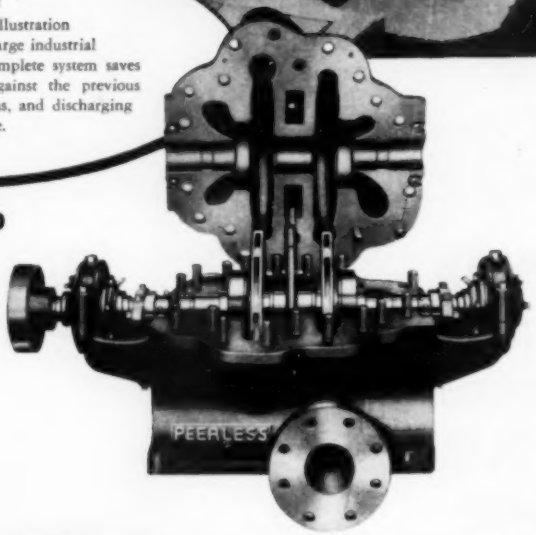
A PLUS in Performance without a premium in price

When moderate capacities and high heads are involved in handling cooling tower water, boiler feed applications, and process liquids, Peerless Type TU pumps will exactly meet your needs. They provide capacities from 50 to 2,500 gpm, head ranges from 250 to 1600 feet and discharge sizes up to 10 inches. The low loop cross-over is cast integral with the top half of the pump case in sizes 4 inches and smaller. Excellent efficiencies and a great number of superior design features that effect long life with minimum downtime provide a performance plus at no extra cost.



MAKING RECORDS!

The Peerless Type TU pump in the illustration operates on a cooling tower system for a large industrial plant. According to their engineers, this complete system saves them over $550.00 every month, as against the previous method of using water from city mains, and discharging into the sewers after one use.



DEPENDABLE, DURABLE AND RUGGED DESIGN AND CONSTRUCTION . . .

Here are a few features of Type TU construction:

Equipped with duplex angular contact thrust bearings, water cooled bearing housings, heavy stiff case rings, sleeves locked against impeller hubs, in-and-out cooling and sealing connections at stuffing box.

High pressure stuffing box on these pumps is under one stage pressure only, regardless of the net pressure developed by the pump.

Spacer bushings between stages are serrated with grooves throughout its length, are longer than competitive pumps, thus making an effective seal between stage pressures.

The Peerless Type TU pump is described in Bulletin B-301. Write for your copy today.

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
Address inquiries to Factories at:
Los Angeles 31, California and Indianapolis 8, Indiana
Offices: New York, Chicago, St. Louis, Atlanta; Dallas, Plainview and Lubbock, Texas; Fresno; Los Angeles; Phoenix; Albuquerque, New Mexico.

NOW . . . Coppus-Dennis FANMIX Action REVOLUTIONIZES OIL BURNER PERFORMANCE 6 WAYS!

1. INCREASES BOILER RATINGS because all of your furnace space is used for combustion . . . none for mixing.

2. STEPS UP FUEL EFFICIENCY because complete combustion is guaranteed with 5% to 10% excess air.

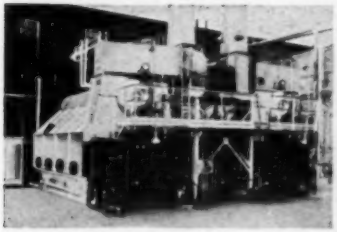
3. GETS RID OF "HOT SPOTS" because continuous explosion kills torch action and disperses heat uniformly.

4. ELIMINATES FORCED DRAFT EQUIPMENT because FANMIX action itself overcomes the entire draft loss across the burners.

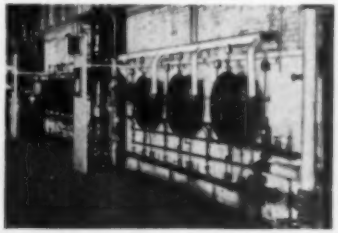
5. CUTS STACK REQUIREMENTS because the forced draft created by FANMIX action calls for less furnace draft.

6. REDUCES COKING OF ATOMIZERS because their tips are air-cooled by the fan blades to a point well below the coking temperature.

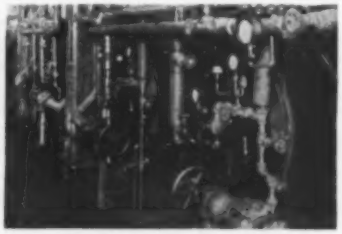
COPPUS-DENNIS FANMIX OIL BURNERS, thoroughly proved in important installations for more than two years, utilize jet reaction of steam-atomized oil to rotate a fan which is an integral part of the burner. Automatically adjusted proportion of high velocity air passes at right angles through the sheet of atomized oil to create an ideal mixture for fast, complete combustion — peak efficiency.



COMMERCIAL SOLVENTS CORP. plant, Terre Haute, Indiana, utilizes Coppus-Dennis FANMIX Oil Burners to fire two fully automatic 250 hp steam generators. Installed early in 1948, these two units have since been supplemented by a third.



AMERICAN WOOLEN CO., in one of its plants, has equipped two 1000 hp boilers with six Coppus-Dennis FANMIX Oil Burners.



BROCKTON EDISON CO. relies on four Coppus-Dennis FANMIX Oil Burners in its plant in East Bridgewater, Mass.

ANOTHER
COPPUS
"BLUE RIBBON" PRODUCT

INVESTIGATE! If you share in the responsibility for the efficiency of your firm's boiler operations, it will pay you to learn why Coppus-Dennis FANMIX Oil Burners, made to Coppus Blue Ribbon standards of quality, promise such superior performance. Send the coupon today.

Please attach this coupon to your company letterhead

COPPUS ENGINEERING CORPORATION
250 Park Avenue
Worcester 2, Mass.

Please send complete data on Coppus-Dennis FANMIX Oil Burners.

Name ..... Title .....

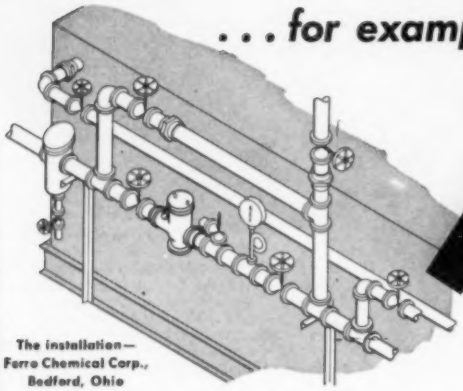
Company .....

Address .....

City ..... Zone ..... State .....

for outstanding service

on Steam to Drying Ovens . . . for example



The installation—
Ferro Chemical Corp.,
Bedford, Ohio

PROBLEM: To maintain automatically, within close limits, uniform reduced steam pressure from supply line to battery of two drying ovens controlled by individual thermostatic valves.

WORKING CONDITIONS: Initial steam pressure of 70 psi to be reduced to 13 psi, and maintained without significant fluctuation whether one, both, or neither of the ovens is being operated.

SOLUTION TO PROBLEM: One No. 960 Crane Brass Pressure Regulator, properly selected for capacity required, and with adequate condensate drainage provided.

RESULT: For more than 5 years, without interruption and with no more than routine maintenance, the Crane No. 960 Regulator has given complete satisfaction. Operating like new, and since all wearing parts are renewable, it will virtually never wear out. User remarks on unusual simplicity of adjustment.

Another typical case history, demonstrating the bigger value and lower ultimate cost of Crane Quality Valves. And why . . . More CRANE VALVES are used than any other make!

. . . Install Dependable Quality CRANE VALVES

No. 960 Crane Brass Pressure Regulator for steam or air. Literature on request through your Crane Branch or Crane Wholesaler.

CRANE CO.

General Offices:
836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

They unload 2000 tons an hour!

B & O giant unloaders first to use new G-E product

G-E *pumpless* rectifiers give lower cost d-c power than conventional pumped rectifiers because vacuum pumping system is eliminated. This means no vacuum headers, indicators or connections and no condensation pump.

PUMPLESS RECTIFIERS

The new Baltimore and Ohio ore facility at Baltimore reduces turn-around time for ore boats and speeds strategic iron ore on its way to the nation's steel-producing centers.

Mercury Arc Rectifiers coupled with adjustable d-c drives are important factors in the highly efficient unloading cycle. Two 1000 kw G-E *pumpless* rectifiers supply the d-c power.

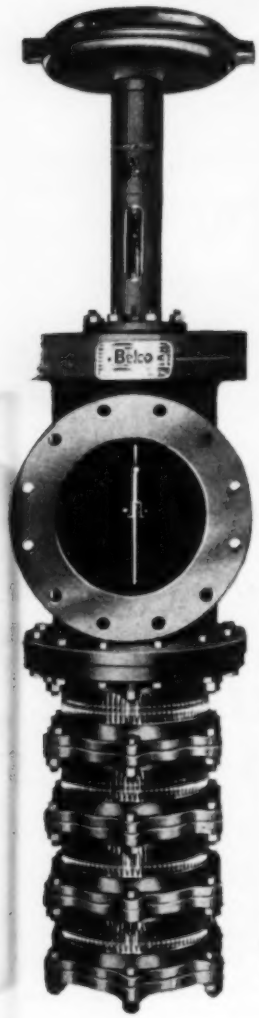
These new G-E *pumpless* rectifiers give continuous low-cost service because they incorporate the latest improvements in design. Vacuum pumps usually required for rectifiers of this great a capacity are eliminated. So are the pumping losses and the water formerly needed to cool the vacuum pumps. All parts are easily accessible for periodic inspection, and any tank can be replaced by a stand-by spare, if necessary.

For information about modern *pumpless*-rectifier conversion to fit your d-c power needs, call or write your nearest G-E sales representative. General Electric Co., Schenectady 5, New York.

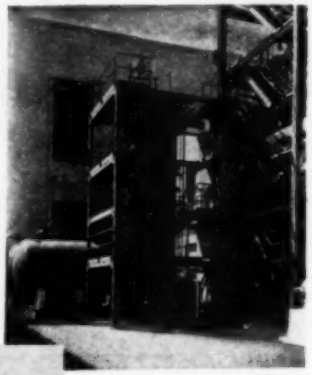
GENERAL ELECTRIC

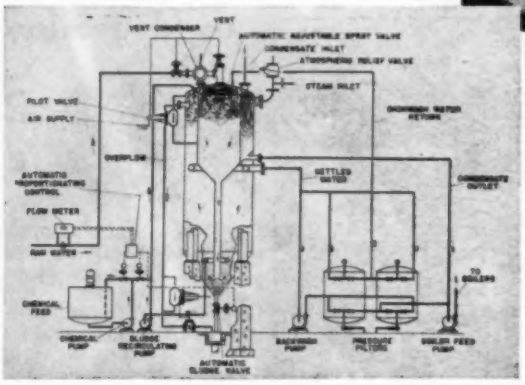
324-5

The exclusive Belco Automatic Atomizing Valve Performs a Superior job in HOT PROCESS SOFTENERS



Yes, the Belco Valve, by dividing influent water into finely atomized droplets insures practically instantaneous heating on contact with the steam atmosphere. Thus elimination of 95% of the dissolved oxygen and all free carbon dioxide is accomplished. Excellent results have been attained with the Belco valve and numerous installations stand as proof of its maximum efficiency. We would like to tell you more. The types of jobs we design and build—the customers we design and build for. Call us next time you consider equipment for the removal of water impurities. We're sure we can help you to your advantage.





You may be interested in Bulletin 103, it describes Belco Heaters, Deaerators & Hot Process Softeners.

Belco

Processes for Removal of Water Impurities

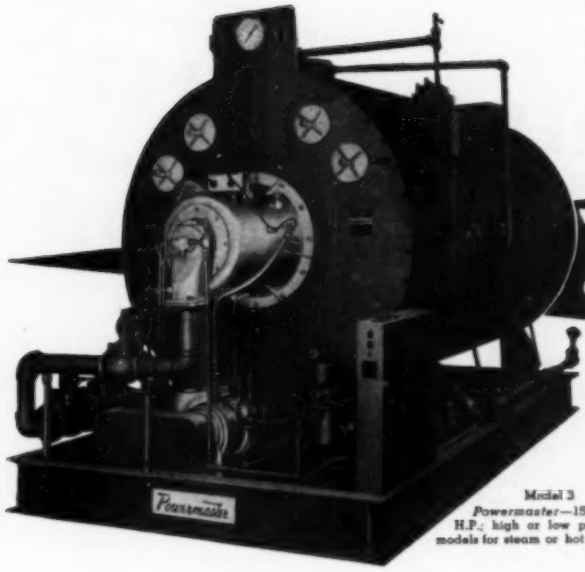
BELCO INDUSTRIAL EQUIPMENT DIVISION, INC.

PATERSON 3, NEW JERSEY

HEADQUARTERS FOR AUTOMATIC CONTROL OF ALL WATER CONDITIONING PROCESSES • AUTOMATIC CHEMICAL PROCESS CONTROLS • WATER SOFTENERS: Hot Lime Soda, Belcolite, Gravity and Pressure Types, Automatic and Manual • **FILTRATION EQUIPMENT:** Gravity and Pressure Filters, Automatic and Manual Filters, Siliceous and Non-Siliceous Filters, Iron, Oil, Taste, Odor and Color Removal Filters • **SWIMMING POOL PURIFICATION EQUIPMENT:** Automatic and Manual • **DIATOMACEOUS EARTH FILTERS • COAGULATION EQUIPMENT:** Slow and Rapid Mix Agitators (Adjustable variable speed) Setting Tanks, Sludge Removers • **SPECIAL EQUIPMENT:** Deionized (Equivalent to Distilled) Water Equipment, Silica Removal Equipment, Boiler Feed Water Heaters, Deaerators, Degasifiers, Chemical Dry Feeders, Chemical Pressure Feeders, Oil Separators (Refining process type)

IN CANADA: BOGUE ELECTRIC OF CANADA LTD., 1405 BISHOP STREET, MONTREAL, QUEBEC

reduce your steam costs 3 ways with the automatic Powermaster



Model 3
Powermaster—15 to 500 H.P.; high or low pressure models for steam or hot water.

Now you can make your own comparison. No other steam generator gives you all of the *Powermaster's* advantages. A special burner design (patent applied for) reduces your cost of hot water and steam for processing or heating. *Powermaster* is the only self-contained steam generator that offers you—

1. *Full boiler efficiency* at 30% to 100% of capacity. You get fuel savings in slack periods as well as during peak loads.

2. *Less time* (and money) spent for boiler clean-up because of *complete fuel combustion.* (Plant studies show that you clean the *Powermaster* steam generator less than other units under average conditions.)

3. *You take advantage* of low fuel rates by changing from oil to gas (or gas to oil) in a matter of minutes. No fuel shortage worries, either.

Write for your free copy of this catalog

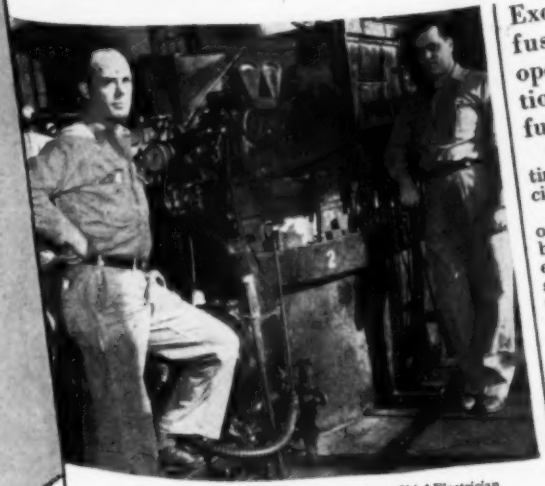
It gives you the complete story of the *Powermaster* Steam Generator . . . ease of installation, construction details, automatic controls and fuel saving features. Just write for a copy of Catalog 1218.

only the Powermaster® *gives you all 3 advantages*

ORR & SEMBOWER, INC., *Established 1885*
910 Morgantown Road, Reading, Pennsylvania

The Detroit News
EWSPAPER FOR MORE THAN 77 YEARS
ree Weekday and Sunday, of Any Michigan Newspaper

FUSE FAILURES ON LEAD POT CIRCUITS STOPPED COLD — BY CHANGING TO FUSETRON FUSES



Wilbert H. Koyle, Asst. Chief Electrician and Henry J. Sieloff, Chief Electrician, standing by one of the giant lead pots used in the plant of The Detroit News.

Excessive heating of ordinary fuses caused 3 to 4 fuses to open every week. Cooler operation of Fusetron dual-element fuses cured trouble completely

"Prior to May 20, 1950, we had a bad time keeping all the electric heating circuits on our lead pots in full operation.

"We have two eight-ton lead pots and one six-ton. Each is electrically heated by single phase, 220 volt, 10 kilowatt elements, fed from a 220 volt, 3 phase source. The circuits on each are protected by sixty 60 ampere and nine 400 ampere, 250 volt fuses.

FOUND 6 TO 8 FUSES BLOWN

"To be sure that all heating elements were operating properly, we used to check all 207 fuses about once in two weeks. Generally our maintenance electrician would find six to eight of the 60 ampere fuses open.

"This meant that our melting pots were not operating at full efficiency and in addition to this loss, our fuse maintenance and purchases were greater than they should be.

WITH FUSETRON FUSES NOT ONE OUTAGE

"As an experiment, we changed all fuses over to FUSETRON dual-element fuses of the same amperages as had been previously used.

"To date, March 9, 1951, or after about nine months of using Fusetron fuses, our records show that not one of them has failed.

"We attribute this remarkable result to the lower resistance of Fusetron fuses which allows them to operate at a cooler temperature than other fuses that we have used."

Henry Sieloff, Chief Electrician
The Detroit News, Detroit, Mich.

Fuses that Protect in 10 Ways now Available

Fusetron dual-element fuses offer user surprising advantages

1 *Protect against short circuits.

2 Protect against needless blows caused by harmless overloads.

3 Protect against needless blows caused by excessive heating — lesser resistance results in much cooler operation.

4 Provide thermal protection — for panels and switches against damage from heating due to poor contact.

5 Protect motors against burnout from overloading.

6 Protect motors against burnout due to single phasing.

7 Give DOUBLE burnout protection to large motors — without extra cost.

8 Make protection of small motors simple and inexpensive.

9 Protect against waste of space and money — permit use of proper size switches and panels.

10 Protect coils, transformers and solenoids against burnout.

*Fusetron Fuses have high interrupting capacity as shown by tests of the Electrical Testing Laboratories of New York City in December 1947.

Details on the Fusetron dual-element Fuse

A fuse link combined with a thermal cut-out — the result, a fuse with tremendous time-lag and much less electrical resistance.

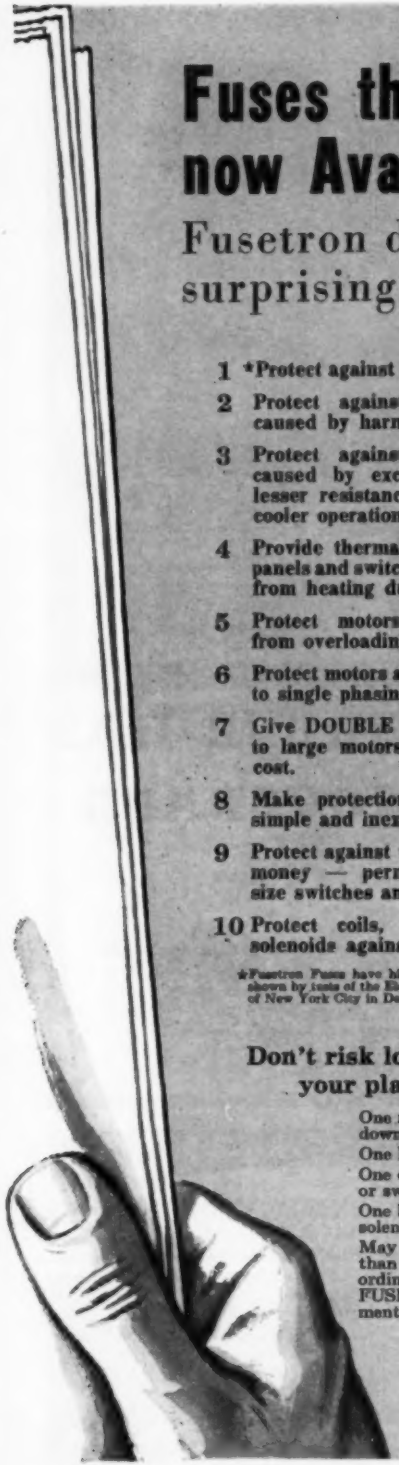
They have the same degree of Underwriters' Laboratories approval for both motor-running and circuit protection as the most expensive devices made.

Made to same dimensions as ordinary fuses, FUSETRON Fuses fit all standard fuse holders.

Obtainable in all sizes from 1/10 to 600 ampere, both 250 and 600 volt types. Also in plug types for 125 volt circuits.

Their cost is surprisingly low.

Fusetron is a trade mark of Bussmann Mfg. Co.



Don't risk losses in your plant!

One **needless** shut-down,
One **lost** motor,
One **destroyed** panel or switch,
One **burned out** solenoid . . .
May cost you more than replacing every ordinary fuse with a FUSETRON dual-element fuse.

Bussmann Mfg. Co.,
University at Jefferson, St. Louis 7, Mo.
(Division of McGraw Electric Co.)

Please send me complete facts about FUSETRON dual-element Fuses.

Name .....

Title .....

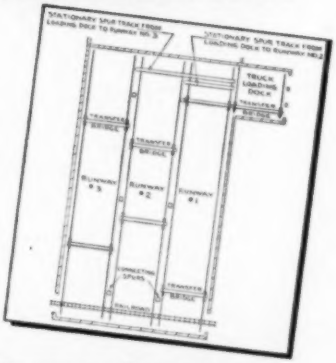
Company .....

Address .....

City ..... State 951

Heavy loads can be handled quickly and easily between all points in this large warehouse by the Cleveland Tramrail bridge system

LARGE TEXAS WAREHOUSE HAS *complete* TRAMRAIL COVERAGE



In the modern warehouse of the Metal Goods Corporation, Dallas, Texas, an extensive Cleveland Tramrail transfer bridge system provides overhead materials handling coverage for the entire floor area including the truck loading dock at the side of the building and a railroad spur at the end of the building. The system is so flexible that it not only can convey materials in several parts of the building at the same time, but it also can handle materials at trucks and railroad cars simultaneously.

Seven interlocking fully motorized push-button-operated floor-controlled bridges handle a vast variety of light metal plate, strips and shapes in this building which is one of the largest of its kind in the entire South.

More materials can be stored in this warehouse because they can be piled higher and far less aisle space is required.

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BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

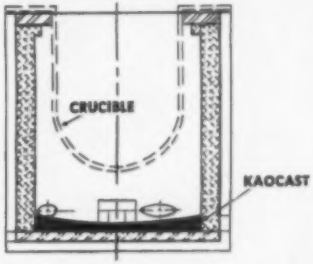
CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7440 EAST 284th STREET - WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

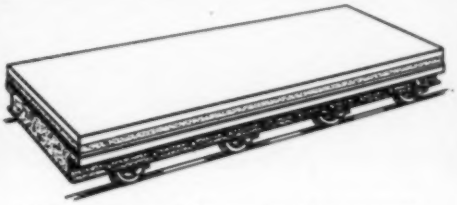
How you can profit with versatile KAOCAST

Since B&W put Kaocast on the market four years ago, this unique 3000F refractory castable has proved its economy and versatility in scores of high-temperature applications. Look at the capsule case studies on this page. Then consult a B&W Refractories Engineer on your specific requirements and see how Kaocast can save money for you.

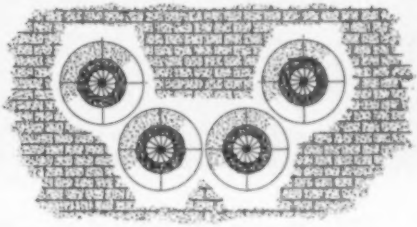
Used to line doors in 15-ton electric furnaces, Kaocast lasted three to four times as long as firebrick . . . cut overall costs in half.



In this magnesium-melting furnace the effect of molten metal previously necessitated replacement of the furnace bottom when the crucible was changed. This is no longer necessary with a lining of Kaocast because it stands up under the intermittent temperatures and has such high spalling resistance.



Kaocast was used for car tops in a ceramic tunnel kiln 150′ long. Ordinary fireclay castables crumbled in only a few trips and required continuous repair, but after 30 trips Kaocast showed no signs of deterioration.



Burner openings in a marine boiler furnace were made of Kaocast. Inspection a year later showed them in such good condition that Kaocast was used for the same application on other ships of the line.

- Versatile Kaocast can be molded quickly and easily with your own labor. It can also be cast directly in place or applied by a cement gun.
- Kaocast eliminates an expensive inventory of special shapes. It speeds repairs and reduces costs.
- Kaocast has high resistance to spalling and slag attack, low volume change and negligible reheat shrinkage.
- Kaocast is available for prompt shipment.
- Kaocast is another example of how B&W sets new standards of performance and economy in the field of high temperature refractories.

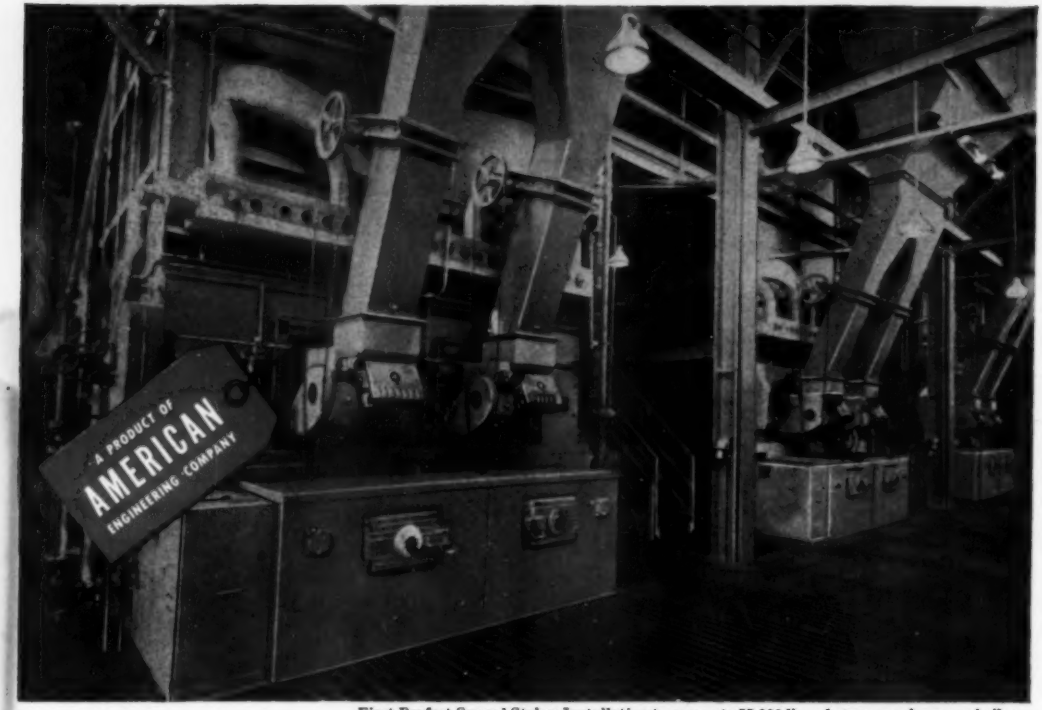
WRITE FOR BULLETIN R-23

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 85 LIBERTY ST., NEW YORK 6, N.Y.
WORKS: AUGUSTA, GA.

B&W REFRACTORIES PRODUCTS—B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick B&W Refractory Castables, Plastics and Mortars • OTHER B&W PRODUCTS—Stationary & Marine Boilers and Component Equipment... Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings

1... 2... and now a 3rd order for



First Perfect Spread Stoker Installation to generate 55,000 lbs. of steam per hour per boiler.

Day and night, for weeks at a time, Spreader Stoker continuously releases 700,000 B.T.U. per hour per square foot of active grate area

1 IN THE FALL of 1949 a very well known corporation installed three AE Perfect Spread Stokers to generate 55,000 lbs. of steam per hour each in one of its midwest plants.

2 Months later the Company needed more steam from larger boilers in another plant where the existing stokers had been designed to burn 12,300 B.T.U. per pound coal. Over the years, however, the available coal dropped to as low as 9500 B.T.U. per pound so the plant could not carry the required load.

On the basis of proved performance, an AE Perfect Spread Stoker was installed as a replacement... and here's the record:

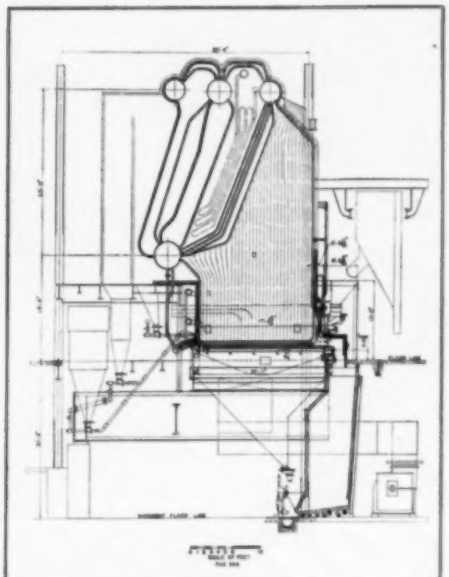
The Perfect Spread has averaged better than 180,000 lbs. of steam per hour—24 hours a day—7 days a week for weeks on end. Efficiency is about 84% and the release rate exceeds 700,000 B.T.U. per sq. ft. of active grate area per hour! In terms of sustained results per sq. ft. of grate surface this is probably the highest duty spreader stoker installation in the world. With an increased manufacturing load they now find they can carry 200,000 lbs. per hour.

3 And now, again on the basis of performance, the same company has ordered two more duplicate Perfect Spread Stokers.*

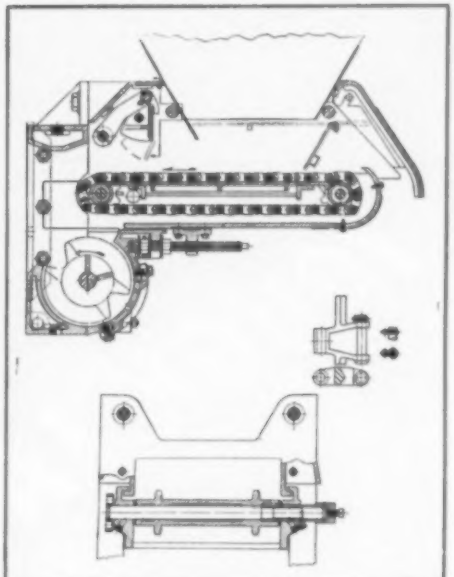
AE Perfect Spread Stokers burn high and low ash coals with practically equal efficiency. They assure positive, continuous coal feed and unbe-

*AS THIS MESSAGE WAS GOING TO PRESS, THE ABOVE COMPANY PLACED A FOURTH ORDER FOR A PERFECT SPREAD STOKER.

PERFECT SPREAD STOKERS



Second larger installation of Perfect Spread Stoker actually giving 200,000 lbs. of steam per hour from a single boiler.



NON-CLOGGING CONVEYOR FEEDER: Coal enters feeder from hopper, and is conveyed positively, continuously and uniformly forward. Coal is not fed in slugs.

lieveably even distribution. *They never clog on wet coal.*

Perfect Spread Stokers have a capacity range from 8,000 to 500,000 lbs. of steam per hour... coal feeders are adjustable from 50 lbs. to 7500 lbs. of coal per hour. Mail coupon today for a copy of the Perfect Spread Stoker booklet and for a reprint of a new report on large spreader stokers. Also, if you are now considering a boiler in capacities from 300,000 to 500,000 lbs. of steam per hour, let's arrange to get together and discuss cross-firing.

WON'T CLOG ON WET COAL

AE

AMERICAN ENGINEERING

COMPANY

PHILADELPHIA 25, PENNA.

AE Products are: Taylor and Perfect Spread Stokers, Marine Deck Auxiliaries, Hele-Shaw and Hydrumite Fluid Power, Lo-Hed Hoists, Lo-Hed Car Pullers.

American Engineering Company
2421 Aramingo Avenue
Philadelphia 25, Penna.

Gentlemen: Kindly send me free copy of Perfect Spread Stoker booklet and new stoker report ☐. I should like to discuss cross-firing ☐.

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State____

TOUGH LAYOUTS

- ✔ Assured Safety
- ✔ Efficient Operation
- ✔ Minimum Fuel Costs
- ✔ Low Maintenance
- ✔ Long, Trouble-Free Life

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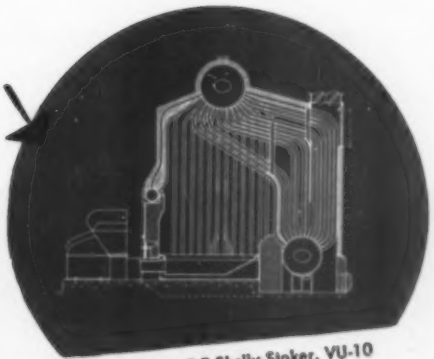
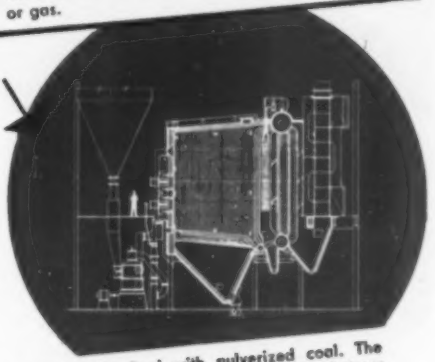
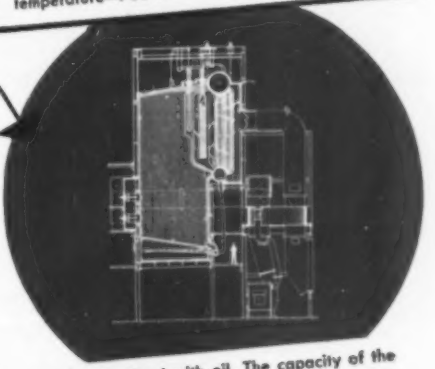
Are VU boilers habit forming?



VU-10 Boiler fired with C-E Skelly Stoker. VU-10 Boilers range in capacity from 10,000 to 60,000 lb of steam per hour. They may be fired by underfeed, spreader or chain grate stokers or by oil or gas.



VU-50 Boiler fired with pulverized coal. The capacity of the unit shown is 150,000 lb of steam per hour; operating pressure—625 psi; total steam temperature—760 F.



VU-50 Boiler fired with oil. The capacity of the unit shown is 350,000 lb of steam per hour; operating pressure—920 psi; total steam temperature —905 F.

The record shows that they are. More than 100 companies . . . large and small . . . throughout this country and abroad . . . have ordered VU units more than once. Nearly half of these have ordered more than twice. Some as many as 5 or 6 times.

Considered in light of the fact that Vertical-Unit Boilers have never been — nor are likely to be — the cheapest you can buy, such a record becomes even more significant.

Here are just a few examples of the many industries that appear to have formed the VU habit.

A Steel Company now has a total of eleven VU Units in three different plants. Starting with an initial installation of three units in 1940, it has reordered twice; three units for a second plant in 1946 and five units for a third plant in 1950.

An Electric Utility Company started using the VU in 1944 when two units were installed at one of their power stations. When the capacity of this station was increased in 1948 two more units were installed. In 1947 this company ordered two more units for another of its stations.

An Oil Company ordered its first VU in 1937, its second in 1938. In 1942 another VU was installed and still another in 1944.

An Aluminum Company is another consistent buyer of VU Units. Since installing its first VU in 1940, it has reordered four times, and now has five C-E Vertical-Unit Boilers in service.

* * *

Just a small sample to be sure, but one that can be repeated over and over for other industries and other companies . . . companies that have ordered and reordered VU Boilers . . . companies that have the "VU habit" and find it highly profitable. B-511A

COMBUSTION ENGINEERING — SUPERHEATER, INC.

Combustion Engineering Building

200 Madison Avenue • New York 16, N. Y.

ALL TYPES OF BOILERS, FURNACES, PULVERIZED FUEL SYSTEMS AND STOKERS; ALSO SUPERHEATERS, ECONOMIZERS AND AIR HEATERS

There's an

Eagle-Picher Insulation

that can help you control temperatures accurately...economically!

Here's just one of the many efficient, economical Eagle-Picher Insulations. It's Eagle-Picher one-coat, all-purpose cement—a revolutionary new product that combines insulating and finishing materials ...that goes on in one easy-to-apply coat.

It gives your equipment highest possible thermal efficiency ... cuts operating costs by saving fuel... and helps to provide perfect, precise control on temperatures.

Whatever your requirements ... there's an Eagle-Picher Insulation that can fit your needs. Find out about them right away!

THESE EAGLE-PICHER PRODUCTS CAN SAVE YOU MONEY ... POWER ... TIME

Insulating Felts • Supertemp Blocks • Blankets Loose Wool • Pipe Covering • Stalastic Insulseal • Insulstic • Swetchek • Finishing Cements • Insulating Cements • Fireproofing Cement • Diatomaceous Earth Blocks

EAGLE-PICHER ONE-COAT, ALL-PURPOSE CEMENT!

A combination insulation and finishing material for temperatures to 1000 F. It's quick setting, rust-inhibitive ... has light color, smooth surface, negligible shrinkage. It has exceptional adhesive qualities on ferrous metals and insulation materials. And it's unaffected by rain or moisture after it sets!

EAGLE EP PICHER

THE EAGLE-PICHER COMPANY • *General Offices: Cincinnati (1), Ohio*

Insulation products of efficient mineral wool — for a full range of high and low temperatures.

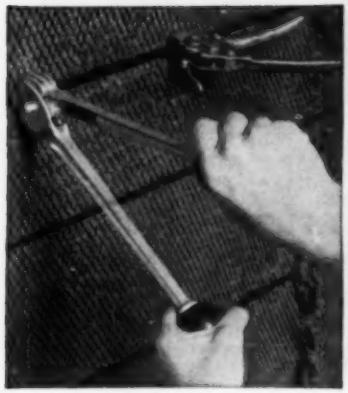
Technical data on request.

Since 1843.

2172 B1

These efficient, versatile insulations "team up" to give perfect insulation for every major application

For a completely effective, low-cost insulation combination, you can't beat the teamwork of Eagle-Picher Mineral Wool Blankets, Supertemp Blocks, Diatomaceous Earth Blocks and Earth Fill, and Super "66" Cement. They work effectively to give your equipment highest possible thermal efficiency . . . cut operating costs by saving the maximum amount of fuel . . . and help to provide perfect, precise control over temperatures.



EAGLE-PICHER MINERAL WOOL BLANKETS

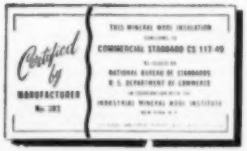
These blankets satisfy the need for a convenient method of quickly and efficiently insulating flat or curved surfaces on larger types of heated equipment. Mineral wool is felted and secured between flexible metal fabric. Outstanding physical and chemical stability enables Eagle-Picher Blankets to resist water, steam, corrosive fumes and normal vibration.

EAGLE-PICHER SUPERTEMP BLOCKS

Eagle-Picher Supertemp Blocks are lightweight (approximately 16 lbs. per cu. ft.). Can be cut easily with knife or saw to fit off-shaped areas . . . they fit snugly over minor irregularities. They're strong and have high refractory value. Withstand temperatures up to 1700 F. Conductivity at 512 F. approximately 0.53 . . . all standard sizes, from 2" x 18" to 12" x 36" in thicknesses from 1" to 4".

EAGLE-PICHER SUPER "66" INSULATING CEMENT

Super "66" is all-purpose, rust-inhibitive, extremely adhesive insulating cement. "Springy ball" pellets don't collapse after application . . . give great coverage, retain their thermal efficiency. 100 lbs. covers approximately 55 sq. ft. —1 inch thick. Easily applied with trowel, over flat and irregular surfaces. Efficient for temperatures up to 1800 F. Reclaimable when used on equipment whose temperatures do not exceed 1200 F.



Eagle-Picher, as a member of the Industrial Mineral Wool Institute, urges that you look for this label. It is a certification by the manufacturer that his mineral wool product conforms to Commercial Standard CS 117-49 as issued by National Bureau of Standards, U.S. Department of Commerce in cooperation with the Industrial Mineral Wool Institute, New York, N.Y.

THE BIG "3"

Capable of rough cutting plus blending of welds.

Only really flexible grinding wheel ever offered.

Withstands extremely rough usage —extra safe.

BAYFLEX • DURACUT • SAF-T-CUT, reinforced abrasive disc-wheels . . . the masters of your weld grinding and finishing problems. Greater resiliency and safety make these "Big Three" products first choice in foundries, metal fabricating and welding shops.

BAY STATE ABRASIVE PRODUCTS CO.
Westboro, Mass.

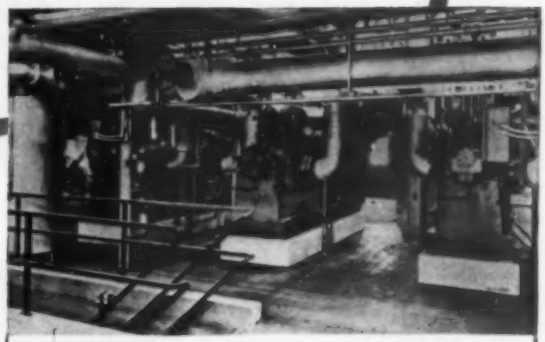
Branch Offices and Warehouses — Chicago, Cleveland, Detroit, Pittsburgh
Distributors — All principal Cities
In Canada: Bay State Abrasive Products Co. (Canada) Ltd.
Brantford, Ontario

BAY STATE ®

Send for latest information-packed "BIG-THREE" catalog. It contains such data as mounting instructions, recommended speeds, charts, specific applications, etc.

What Metals Are Best For Centrifugal Boiler Feed Pumps?

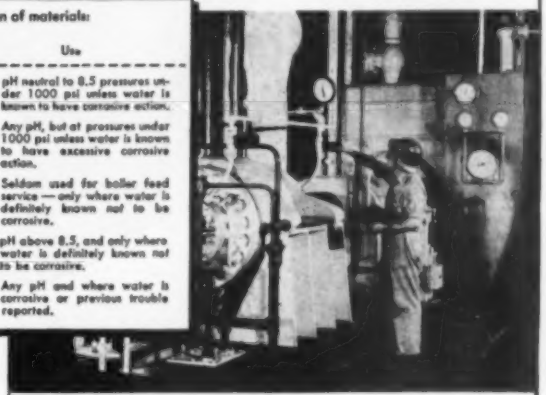
Drawing on their long experience in the field of hydraulics, Worthington engineers produce boiler feed pumps that are metallurgically correct in design, meeting every requirement as to temperature, pressure and corrosion-erosion resistance. As a result, Worthington boiler feed pumps perform better and last longer.



Three Worthington Axially Split Centrifugal Boiler Feed Pumps At The Kansas Power And Light Company Plant, Hutchinson, Kansas.

The following table represents Worthington's recommendation of materials:

Casing	Fittings	Maximum Temperature	Use
1. Cast Iron	Bronze	250 F	pH neutral to 8.5 pressures under 1000 psi unless water is known to have corrosive action.
2. Cast Iron	13% Chromium Stainless Steel	350 F	Any pH, but at pressures under 1000 psi unless water is known to have excessive corrosive action.
3. Carbon Steel	Bronze	250 F	Seldom used for boiler feed service — only where water is definitely known *not* to be corrosive.
4. Carbon Steel	13% Chromium Stainless Steel	400 F	pH above 8.5, and only where water is definitely known not to be corrosive.
5. 5% or higher Chromium Steel	13% Chromium Stainless Steel	Any temperature normally encountered	Any pH and where water is corrosive or previous trouble reported.



One of Several Solid Barrel, Radially Split, High Pressure Boiler Feed Pumps at the Trenton Channel Station of the Detroit Edison Co.

This proven selection of materials coupled with the most advanced design, superior workmanship and a thorough knowledge of application show why . . .

THERE'S A *RIGHT* WORTHINGTON PUMP FOR YOU

. . . *right* for the pressure and temperature of your boiler feed service . . . *right* for maximum economy and dependability. For further proof that *there's more worth in Worthington*, contact our nearest District Office, or write to *Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, N. J.*

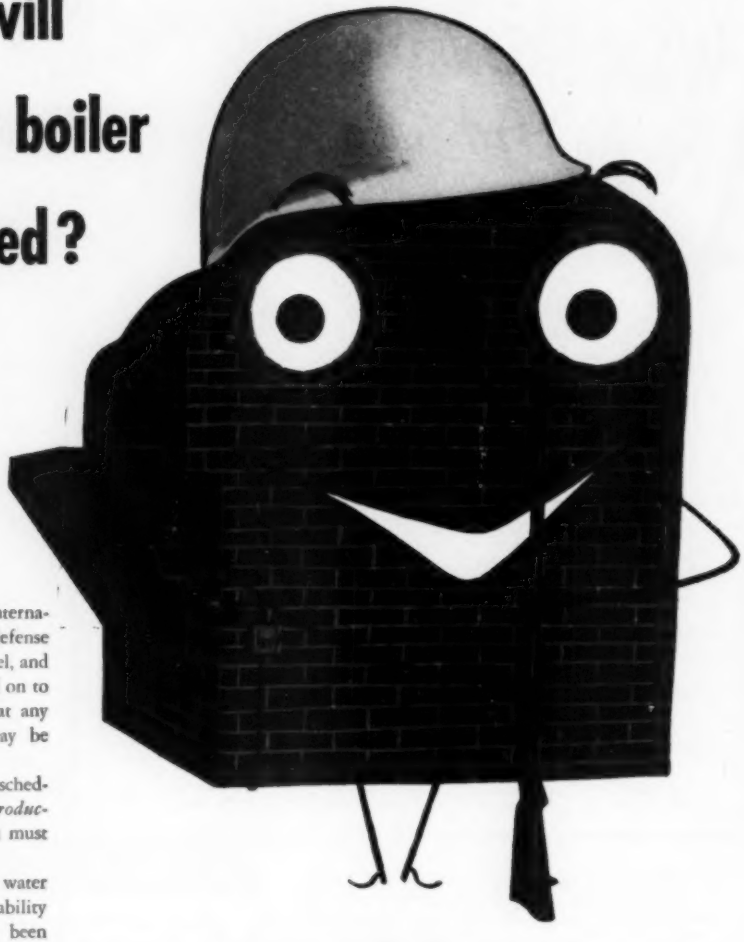
WORTHINGTON

C1.2

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB

For Boiler Feed Service
Capacities to 1500 GPM
Heads to 1000 Ft.
For Hotwell, Condensate, Chilled Water Service
Capacities to 1400 GPM
Heads to 650 Feet
For Boiler Feed Service
Capacities to 1500 GPM
Heads to 1600 Feet
For Water Works, Circulation, Drainage, General Service
Capacities to 135,000 GPM
Heads to 400 Feet
For Boiler Feed Service
Capacities to 1600 GPM
Heads to 3500 Feet
For Boiler Feed Service
Capacities to 3000 GPM
Heads to 7000 Feet

When will your spare boiler be drafted?



AS LONG AS the present international situation continues, defense production will be at a high level, and almost every plant may be called on to participate—which means that at any moment your 'spare' boiler may be needed in regular service.

Under these circumstances, unscheduled boiler outages mean *lost production*, at a time when production must be kept high.

Proper conditioning of boiler water is a major factor in boiler availability —and Hall Laboratories have been leaders in boiler water conditioning for more than a quarter of a century. They are prepared to recommend procedures which, in your specific situation, will give most desirable results at minimum investment and lowest operating costs.

Hall Laboratories are not, however, limited to boiler water conditioning. Hall also offers *plant-wide* water service, for every problem concerning the use of water in industry comes within the scope of Hall activities. May we send you a copy of the new Hall bulle-.in "Your Most Important Raw Material"?

Hall Laboratories, Inc., Hagan Building, Pittsburgh 30, Pa.

HALL *plant-wide* WATER SERVICE

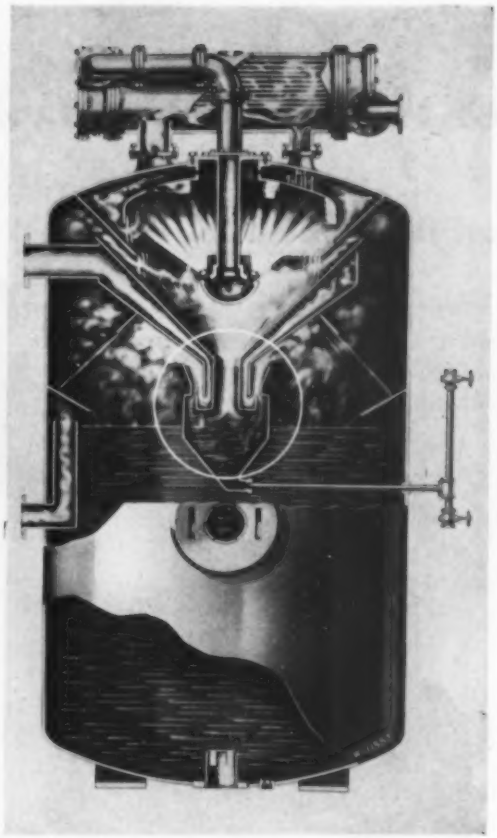
BOILER WATER CONDITIONING

PROCUREMENT, TREATMENT, USAGE AND DISPOSAL OF INDUSTRIAL WATER

LATEST WORTHINGTON NEWS

Scale Problem Licked!

Fewer Clean-outs . . . Shorter Shutdowns



Hard scale, formed on the trays of deaerating evaporator preheaters, is no longer the big problem it used to be.

In a large central station (name on request), the preheaters had to be cleaned every three weeks, and the units were completely shut down at that time from eight to ten hours.

Then Worthington steam-jet deaerators were installed—with a "blowdown" head designed by Worthington engineers. This special head allows the operator to remove harmful deposits at regular intervals *while the unit continues in service*. It also provides for simple and speedy acid cleaning of critical parts, when necessary, without even opening an access door or removing any parts from the unit.

Compare The "Time-Outs"

The Worthington unit, given a short blowdown once each shift, stays in continuous operation with maximum deaeration for periods of at least 8 months. When the acid treatment is given at the end of that period, the job is finished in under three hours.

Compare this with the former record. *Then*—8 to 10 hours outage every three weeks and labor by a *crew* of men. Now—with Worthington's blowdown head—operation uninterrupted during regular short blowdown, with a shutdown for acid cleaning only once in almost a year, requiring only one man and three hours!

Worthington Makes Deaerating Equipment News

Developments like this, applicable to any deaerators operating under conditions of scaling, are typical of Worthington's engineering firsts in water treating and deaerating equipment.

Worthington manufactures all of the equipment needed in a complete water treating installation. For further information on why *there's more worth in Worthington*, address Worthington Pump and Machinery Corporation, Steam Power Div., Harrison, N.J.

WORTHINGTON

S.I.I

A GREAT TEAM IN STEAM

Feedwater Heaters

Ejectors

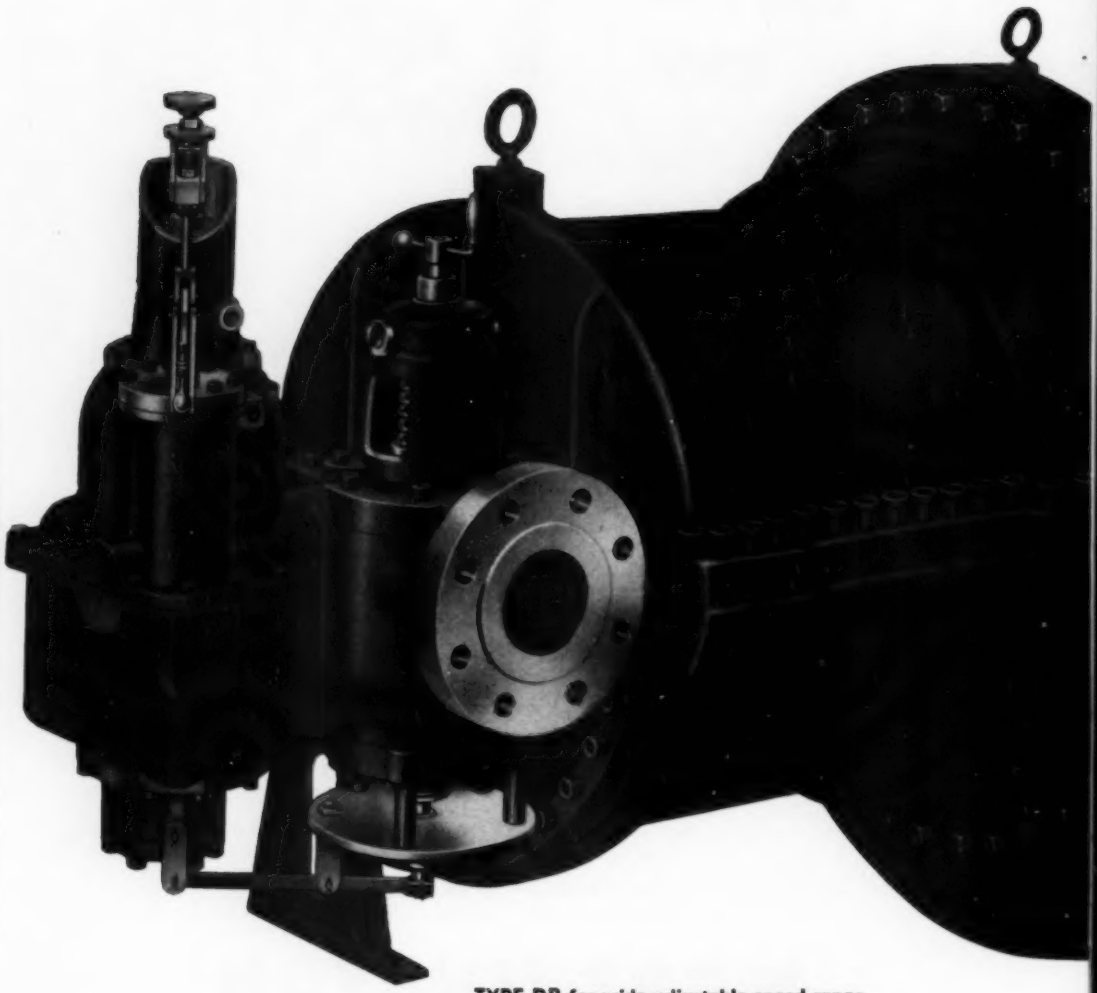
Boiler Feed Pumps

Water Treating Equipment

Steam Turbines

Surface Condensers

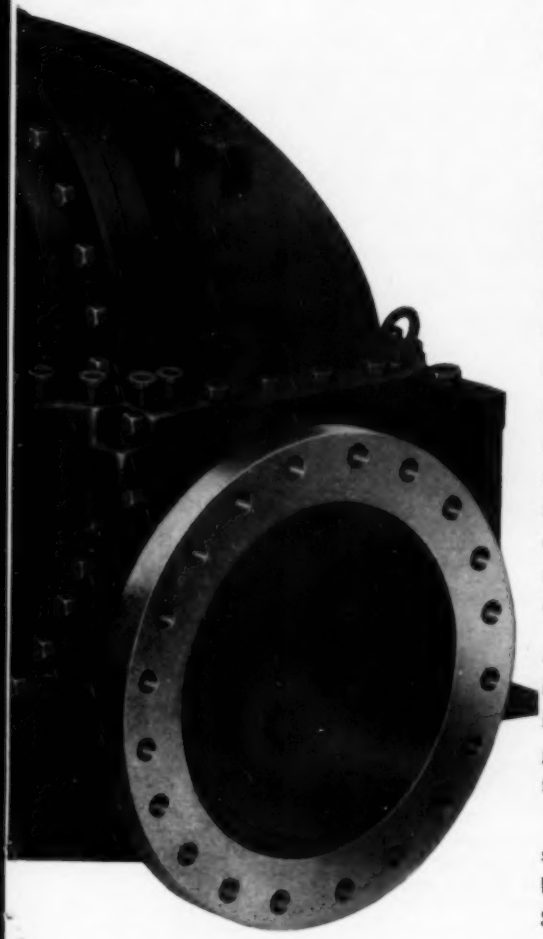
GENERAL ELECTRIC ANNOUNCES *New*



TYPE DR for wide adjustable-speed range

Multi-Stage Turbines

Available in Four Designs—200 to 5000 hp



Now in production! General Electric's completely new, multi-stage turbine drives . . . designed to give you maximum mechanical power for every fuel dollar . . . available to meet any mechanical drive application where efficiency and reliability are "musts."

FOUR NEW TYPES—The DP, DR, DRV, DRVX—incorporate the newest ideas in improved turbine design. Four different governing systems give you a wide selection of performance ratings for either condensing, noncondensing or automatic extraction applications.

NEW FEATURES that spell increased economy and reliability are built into General Electric's new multi-stage turbines. A completely new sectional valve gear, for instance, gives you greater efficiency for part load operation. Refinements in governing, lubrication and steam chest design make these the finest mechanical-drive turbines General Electric has ever produced.

A NEW TECHNIQUE of manufacturing from standard, interchangeable patterns promises you savings in initial investment and shortened delivery time. You get a custom turbine, designed for your job, built from standard parts.

Get the full particulars on these brand new multi-stage turbine drives. Write for your copy of our new bulletin, GEA-5580, "G-E Multi-Stage Turbine Drives." Section 252-52, General Electric, Schenectady 5, N.Y.

252-52

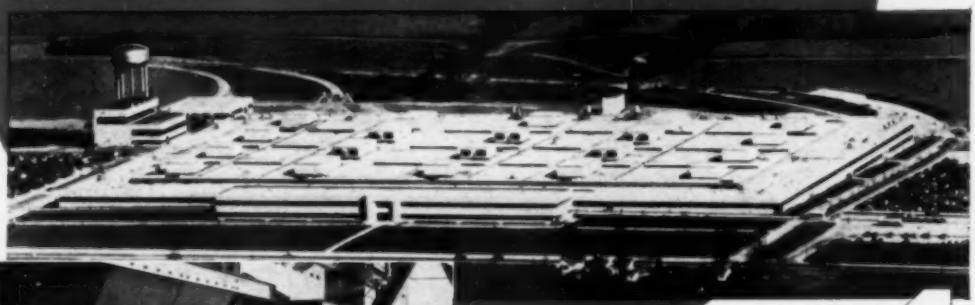
GENERAL ELECTRIC

Western Electric dialed the right number

Western Electric engineers dialed the right number when they selected Detroit RotoGrate Stokers for their new Indianapolis Plant—the world's largest factory devoted to making telephone sets.

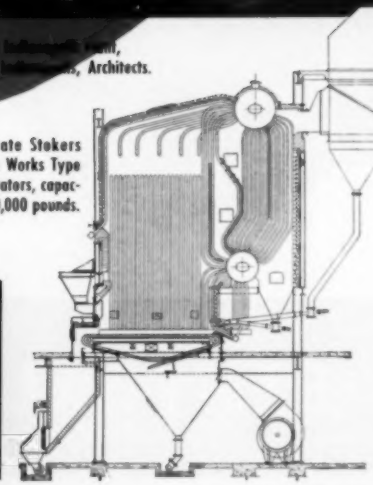
Detroit RotoGrate is the original spreader stoker with forward-moving grates that discharge ash at the front. It burns any Bituminous coal or Lignite and may be adjusted from one fuel to another. Permits higher burning rates to produce more capacity per foot of furnace width.

RotoGrate Stokers easily handle fluctuating loads—have a record of exceptional efficiency with a wide variety of installations. • Write for bulletin.



Western Electric Indianapolis Plant, Allen & Kelley, Indianapolis, Architects.

Detroit RotoGrate Stokers with Union Iron Works Type VO steam generators, capacity each unit, 60,000 pounds.



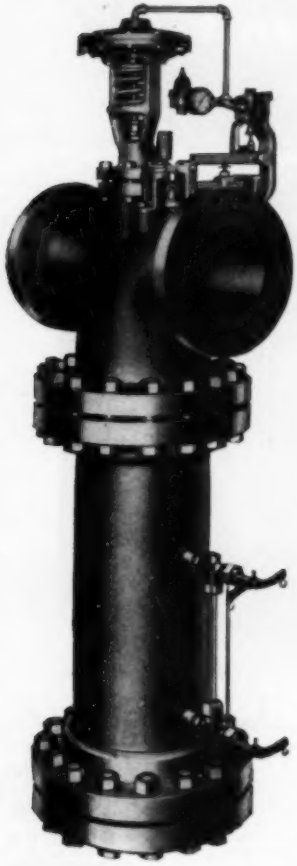
DETROIT STOKER COMPANY

General Motors Building—Detroit 2, Michigan

District Offices in Principal Cities • Works at Monroe, Michigan

Designed ONLY for the TOUGH JOBS

BUILT FOR PERFORMANCE . . . NOT DOWN TO PRICE!

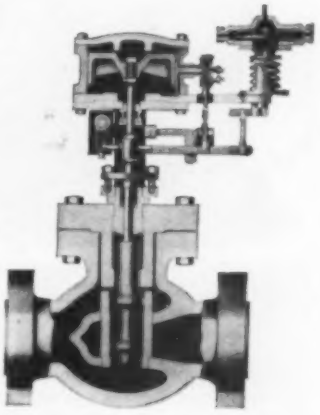


WHEN you select your pressure reducing and desuperheating station, you'll pay more if you buy COPES. But if your job is a tough one, you'll find COPES cheapest in the long run. You'll be money ahead in installation, operation and maintenance costs, and you'll be getting *accurate* control—even down to your lightest loads, not just at your normal flows.

You'll get *quiet* operation—avoiding annoying chatter and destructive vibration.

You'll get 'round-the-clock dependability for years to come—with any adjustments or maintenance easily handled by your plant personnel.

It all adds up to the kind of performance you need for your tough jobs—results you cannot expect if you buy on price.



NORTHERN EQUIPMENT DIVISION
CONTINENTAL FOUNDRY & MACHINE COMPANY
1013 GROVE DRIVE, ERIE, PENNA.

The COPES DESUPERHEATER

You'll find it easy to install the self-contained COPES Desuperheater. It goes into the line as a unit, with only three connections. All accessories are furnished. You need no extra steam atomizing valve with extra stop valves—no long run of alloy-steel steam piping—no extra piping from the temperature element to the spray nozzle—no other extras.

You'll also find your COPES Desuperheater correctly sized for low velocities—for minimum noise, vibration and wear. You'll find temperature control accurate—even on lightest flows—because cooling water is controlled and completely atomized inside the mixing chamber. Adjustment is simple and permanent.

The COPES REDUCING VALVE

You'll find your COPES valve ports accurately designed for the correct capacities under the flow and pressure conditions you specify. You'll have no "hunting" to upset the precision of your control.

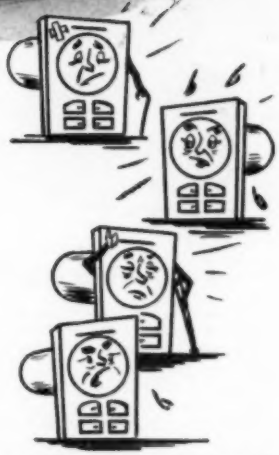
You'll find extra-heavy construction throughout. The valve piston is supported and guided in the areas subject to greatest velocities and forces. If these forces could cause excessive erosion, Stellite is welded to all contact surfaces before they are precision-ground to correct clearance for your installation. You'll find design and construction minimizes the possibility of sticking, leaking or vibrating. You'll suffer no objectionable noise.

ENGINEERED BY THE MAKERS OF COPES FEED WATER REGULATORS

Formula for Saving Steam Dollars

300 h. p. (rated) ERIE CITY VL Boiler - Stoker unit

Factory Assembled!



Consider this modern Erie City "VL" Steam Generator when your firetube boilers are ready for retirement. One Erie City "VL" boiler, arranged for stoker firing, as illustrated, will easily replace a battery of old hand-fired boilers, and will occupy considerably less space. You can't help but save steam dollars—with an Erie City mechanically fired "VL"—it's easy to do. With either coal, oil or gas the Erie City "VL" will give top performance. Write us for additional facts. Ask for Bulletin SB24B.

COMPLETE STEAM POWER PLANT EQUIPMENT

ERIE CITY

Complete Steam Generators • Type C 3-Drum Boilers • Types VL & VC 2-Drum Boilers • "Economic" Boiler with or without Water Walls • Welded H. R. T. Boilers • Welded Steel Heating Boilers • "Keystone" Packaged Steam Generators • Coal Pulverizers • Underfeed and Spreader Stokers • Welded Pressure Vessels for the Process Industries.

ERIE CITY IRON WORKS • ERIE, PA. • *Since 1840*

NOTES for the Power Engineer

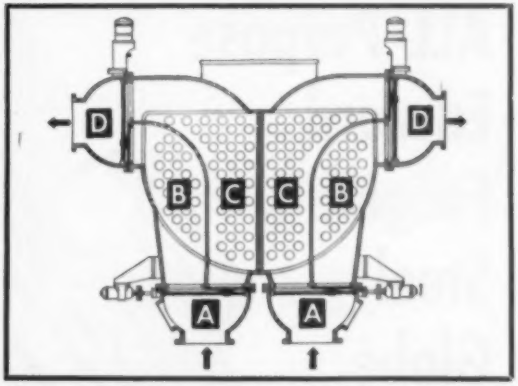
C. H. Wheeler OF PHILADELPHIA

STEAM CONDENSERS—STEAM JET EJECTORS—COOLING TOWERS—VACUUM REFRIGERATION—HIGH VACUUM PROCESS EQUIPMENT—MICRO-PARTICLE REDUCTION MILLS—MARINE CONDENSERS & EJECTORS—DECK MACHINERY

"REVERSE FLOW" CONDENSERS

SOLVE YOUR CLEANING PROBLEMS—REDUCE OPERATING COSTS

These advantages are possible only in C. H. Wheeler's unique design of an integral reverse-flow steam condenser. By an arrangement of electrically or hydraulically controlled sluice gates, the flow of water through the condenser tubes is reversed. Refuse is rapidly and thoroughly flushed down the discharge in a matter of minutes, without shutdown of the unit. In addition to saving cleaning time and eliminating labor costs, you improve the efficiency of the whole unit by not reducing load. The need for expensive mechanical water straining apparatus is also eliminated. Reverse-Flow may be incorporated in either divided or non-divided water boxes.



CROSS-SECTION DUAL BANK CONDENSER SHOWING HOW "REVERSE FLOW" WORKS

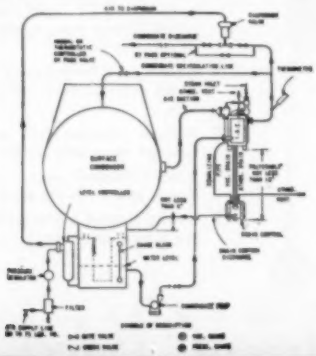
Both halves work the same but independently of each other.

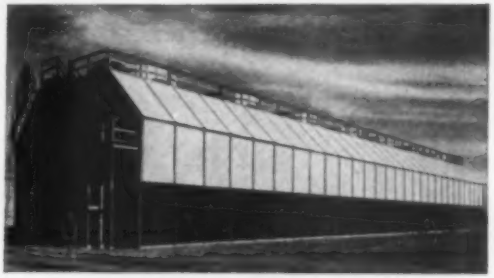
Left Side: Water enters divided water box at valve chamber A, with left port open. It flows through pass B to end of condenser, back through pass C and out through upper port of D.

Right Side: Flow is reversed: Valves at inlet A and discharge D are changed to permit water to flow through C and back through B in the opposite direction, then out through lower port of D.

RECOMMENDED HOTWELL LEVEL CONTROL WITH TUBEJET AIR EJECTOR

This diagram is typical of the information awaiting you in Specification 88. This 4-page illustrated bulletin describes the improved steel shell Tubejet Air Ejectors with combined surface type inter-after condenser. Many power plant engineers are adopting this more reliable, space saving equipment for stationary power plant use. A request on your company letterhead will bring a copy of Specification 88 by return mail.





C. H. WHEELER COOLING TOWERS Selected by CITY PUBLIC SERVICE BOARD SAN ANTONIO, TEXAS

Gibbs & Hill, Inc., Engineers & Constructors

One 30,000 gpm induced-draft cooling tower is already in place at the Leon Creek Power Station. The second tower for the same capacity is now being constructed. Each of these towers supplies a 30,000-kw preferred-standard turbine-generator, and is designed to cool water from 105.5F to 90F at a wet bulb of 76.5F. *Features of these and other C. H. Wheeler Cooling Towers are described in Catalog 145. This and the popular 16-page book, "Cooling Tower Maintenance," will be mailed on request.*

C. H. WHEELER MANUFACTURING CO., 1804 SEDGLEY AVE., PHILADELPHIA 32, PA.

REPRESENTATIVES IN MOST PRINCIPAL CITIES

For Features that Mean Long Valve Life and Low Cost Service Get this ALL-Purpose Edward Forged Steel Globe Valve

Edward Fig. 444-448 series, built in sizes ⅛ to 2 in. inclusive . . . forged steel globe and angle . . . 600 and 1500 lb sp . . . bolted or union bonnet . . . screwed or socket welding ends . . . Fig. 448 illustrated.

CHECK THESE Big FEATURES

- ✓ Hard bronze yoke bushing to prevent stem seizing or galling . . . lock welded to yoke
- ✓ Packing is Edward EValpak . . . heat resistant, water-proofed and die molded for long service
- ✓ Disk of EValloy 13% chromium or Stellite . . . slotted or disk nut type . . . self centering
- ✓ Tight, easily accessible bolted or union bonnet joint . . . with Ironkote gasket of 90 Brinnel max. hardness for leak-proof joint
- ✓ Heat treated forged steel inclined stem globe type body for lowest pressure loss
- ✓ Built-in pressure-tight backseat . . . permits repacking under pressure
- ✓ Roomy forged yoke . . . plenty of finger space for repacking
- ✓ Strong forged gland bolts . . . plated for long thread life

Edward Valves, Inc.
122 West 144th St., East Chicago, Ind.

Please send literature covering your Fig. 444-8 series all-purpose forged steel valves.

Name_____

Company_____

Position_____

Address_____

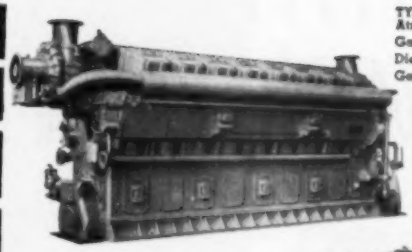
City_____ Zone____ State_____

Edward Valves, Inc.

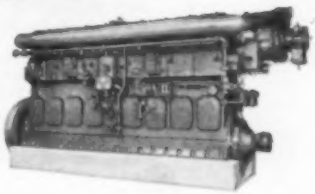
Subsidiary of ROCKWELL MANUFACTURING COMPANY

EAST CHICAGO, INDIANA

● Identified here are five of the most popular Cooper-Bessemer stationary engine types—in a power range from 290 to 3700 bhp. Not only does each type offer variety in the number of cylinders, but most are available as gas engines, gas-diesels or full diesels. Moreover each type comes either atmospheric or supercharged.



TYPE LSV . . . . . 12 or 16 cyl.
Atmospheric and Supercharged
Gas . . . . . 1440 to 3700 hp.
Diesel . . . . . 1650 to 3700 hp.
Gas-Diesel . . . . . 1650 to 3700 hp.



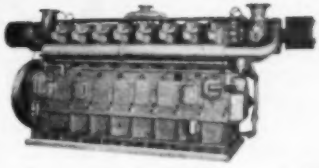
TYPE LS . . . . . 6, 7 or 8 cyl.
Atmospheric and Supercharged
Gas . . . . . 720 to 1850 hp.
Diesel . . . . . 825 to 1850 hp.
Gas-Diesel . . . . . 825 to 1850 hp.

WHEN IT COMES TO POWER . . .

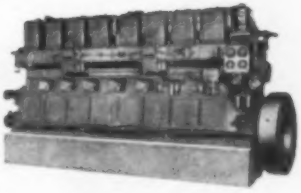
the better it "fits", the less it costs!

This gives you some idea of how well Cooper-Bessemer is prepared to meet your power requirements ideally — with the engine qualities that mean a whale of a lot in trouble-free service and especially in low over-all operating costs!

If your plans call for defense-supporting power, be sure to check with Cooper-Bessemer. Get all the facts on features that pay off for Cooper-Bessemer users time and time again.



TYPE FV . . . . . 6, 8, 12 or 16 cyl.
Diesel—
Atmospheric . . . . 290 to 1230 hp.
Diesel—
Supercharged . . . . 430 to 1850 hp.



TYPE JS . . . . . 5, 6, 7 or 8 cyl.
Atmospheric and Supercharged
Gas . . . . . 375 to 1500 hp.
Diesel . . . . . 430 to 1500 hp.
Gas-Diesel . . . . . 430 to 1500 hp.

TYPE GS . . . . . 5, 6 or 8 cyl.
Atmospheric and Supercharged
Gas . . . . . 320 to 1200 hp.
Diesel . . . . . 300 to 1200 hp.
Gas-Diesel . . . . . 300 to 1200 hp.

The
Cooper-Bessemer
Corporation

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

New York Washington, D. C. Bradford, Pa. San Francisco Houston, Dallas Greggton, Pampa and Odessa, Texas Seattle Tulsa Shreveport St. Louis Los Angeles Chicago Caracas, Venezuela Cooper-Bessemer of Canada, Ltd., Halifax, Nova Scotia Gloucester, Mass. Calmes Engineering Co., New Orleans, La.

Republic Tips TO AIR HOSE USERS . . .

The simple "do's" and "don'ts", offered here as Republic Rubber tips can help you keep your hose in top working condition . . . capable of giving longer, uninterrupted service at reduced costs.

Your local Republic Rubber Distributor can help you select, apply and properly maintain the right product for your particular need. Contact him today.

Remember Republic Rubber has been *the* specialist in the field of Industrial Rubber Products for more than 50 years. Use Republic products and you use the best. Use Republic products *correctly* and you save the most!

Most compressors spit oil and heat in attached air lines. Action of these deteriorating agents can be retarded by use of a short, detachable lead which assumes the brunt of the punishment. Leads are easy and economical to replace. Turning hose end for end also helps by alternating positions of greatest exposure.

Do not allow hose to become kinked or twisted. Although a good hose may show no immediate ill effects, such treatment damages the carcass structure, giving deterioration a good spot to concentrate on.

You can store hose indefinitely if you select a cool, dry place. Wall-hung reels or saddles make ideal hose depositories, providing coils are clean, evenly wound and supported on radii large enough to prevent kinking.

REPUBLIC'S CHAMPION SUPER SERVICE AIR HOSE

● Republic's Champion Air Hose is a top-quality, braided hose, combining ruggedness with extreme flexibility and light weight. It's built with a smooth friction-reducing, oil-resisting tube, surrounded by multiple braids of specially processed, chemically strengthened fabric. A thick black, armor-like safety cover wards off destructive blows from falling objects—stands firm against abrasion and wear. Champion Air Hose is supplied in all standard sizes in 50-foot lengths. Consult your Republic Distributor for full facts on this and other money-saving Republic Industrial Rubber Products.

INDUSTRIAL RUBBER PRODUCTS BY

REPUBLIC RUBBER DIVISION

Lee Rubber & Tire Corporation

YOUNGSTOWN, OHIO

IDENTIFICATION DISC: An aluminum marking plate on all Walworth No. 225P's facilitates inventory control and makes reordering quick and positive.

take a good look at the Walworth "500 Brinell" no. 225P Globe

NEWLY DESIGNED HANDWHEEL: Patented air-cooled, finger-fit handwheel affords sure grip even with greasy gloves.

– the Toughest Bronze Valve Your Money Can Buy

The stainless steel, corrosion resistant seats and discs are heat treated to a hardness of 500 Brinell – hard enough to scratch glass and crush nails! The valve can be closed on sand, slag, and pipe scale without injury to the seating surfaces. "Wire drawing" is practically eliminated. All parts are accurately machined and gaged. Years of tight, positive shut-off are assured.

Available in both globe and angle types (angle type: No. 227P) in sizes ¼" to 2", this quality valve is recommended for 350 lbs. W.S.P. at 550 F, and 1000 lbs. non-shock service on cold water, oil, gas, or air.

For full data on this long-life, economical Walworth Bronze Valve, see your local Walworth distributor, or write for Circular.

IMPROVED PACKING: Molded packing of lubricated asbestos reinforced with copper wire. Suitable for practically every service. Valves can be repacked under pressure when fully opened.

note these 7 Great Features

HEXAGONAL UNION BONNET CONNECTION, DEEP STUFFING BOX AND RUGGED STUFFING NUT: Union bonnet connection eliminates any chance of distortion or leakage even though valve is repeatedly taken apart and reassembled.

OVERSIZE STEM: The high-tensile strength silicon-bronze stem assures long life and protection against wear.

SEATS AND DISCS: Plug type seats and discs of stainless steel, heat-treated to 500 Brinell hardness and machined simultaneously to a mirror-like finish, with accurate tapers assures tight positive shut-off with minimum handwheel effort.

EXTRA STRONG BODY: Made of Composition M (ASTM B61) bronze. Thick walls and rugged hexes provide a high safety factor. Valves undergo hydrostatic shell test of 1,000 psi.

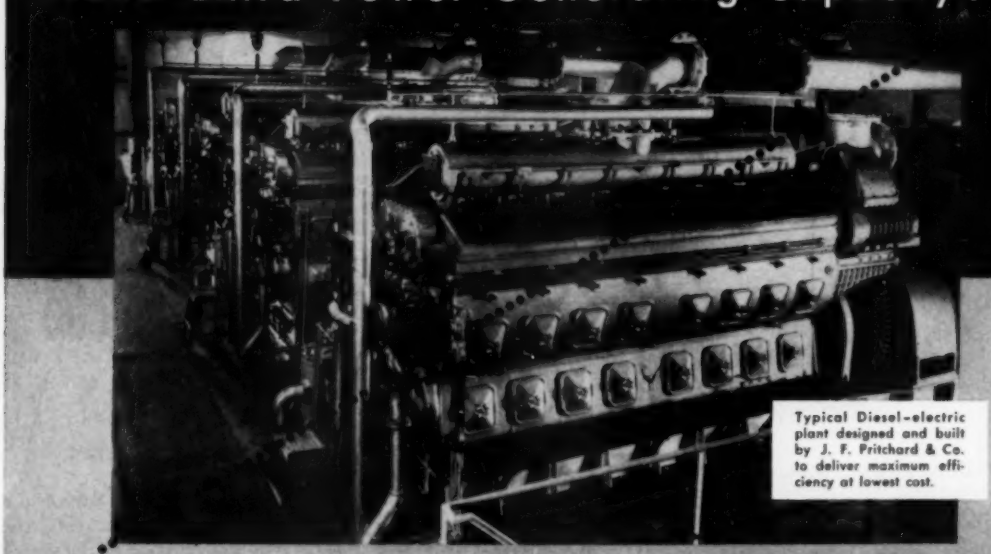
WALWORTH

valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Need Extra Power Generating Capacity?

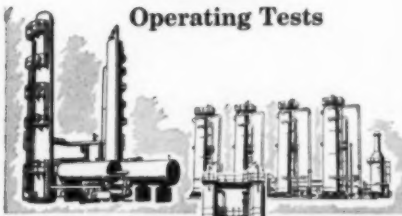


Typical Diesel-electric plant designed and built by J. F. Pritchard & Co. to deliver maximum efficiency at lowest cost.

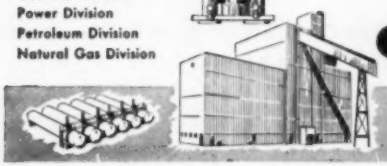
Develop It Quickly, Easily, Profitably With a Pritchard Diesel-Electric Plant!

Pritchard's Single Responsibility Contract Includes

Design
Engineering
Purchasing
Field Construction
Guarantees
Operating Tests



Chemical Division
Power Division
Petroleum Division
Natural Gas Division



If you are a forward-looking industrialist or utility executive seeking to retain essential profit margins in the face of rising labor and materials expense, you'll undoubtedly recognize an adequate source of power as essential for improving plant efficiency and maintaining a profitable level of operation.

For more than a quarter-century, J. F. Pritchard & Company has rendered valued service to utility and industrial clients in this country and abroad concerning every variety of problem related to electric power generation.

You, too, are invited to rely upon the experienced engineering counsel of Pritchard's Power Division to make your next power installation *outstanding* in proved design, operating practice, equipment and construction. Write for complete information.

NATIONAL CONSTRUCTORS ASSOCIATION MEMBER

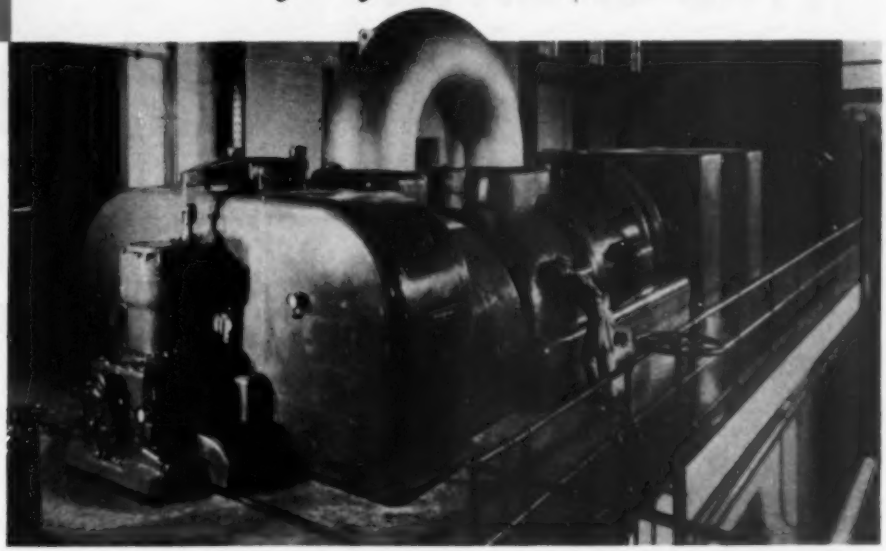
J.F. Pritchard & Co.

DESIGN • ENGINEERING • CONSTRUCTION

Dept. No 192 — 908 Grand Ave., Kansas City 6, Mo.

District Offices: CHICAGO • HOUSTON • NEW YORK • PITTSBURGH
TULSA • ST. LOUIS • Representatives in Principal Cities from Coast to Coast

2 ways to insure a clean lubricating system for your new turbine . . .



FLUSH with Gulf Turbine Flushing Oil

FILL with Gulfcrest, the world's finest turbine oil

By taking these two steps, you can insure top lubricating efficiency down through the years for your new steam turbine.

The use of Gulf Turbine Flushing Oil—before the initial fill of lubricating oil—will remove grease-type slushing compounds and carry away harmful abrasives which might be in the circulating system. And, it protects all oil-bathed surfaces against rust. Because Gulf Turbine Flushing Oil is itself a satisfactory lubricant, the undrained portion does not impair the lubricating value of the turbine oil.

Then, to keep the new system clean, fill with Gulfcrest Oil. Because of its outstanding resistance to oxidation, Gulfcrest maintains an exceptionally low neutralization number, and lasts indefinitely. With this quality oil and good operating practice, you can be sure there will be no sludge deposits in cooler tubes, bearing pedestals, or oil lines to worry about.

To get these benefits for your new turbines, call in a Gulf Lubrication Engineer today. Write, wire, or phone your nearest Gulf office.

Gulf Oil Corporation · Gulf Refining Company

GULF BUILDING, PITTSBURGH, PA.

FIFTY YEARS OF SERVICE 1901 GULF 1951

PETROLEUM AND ITS PRODUCTS

This man...

HELPS YOU IMPROVE YOUR PRODUCT!

New materials and better manufacturing methods contribute improvement to a product no less than new and better design. How can the manufacturer know when there is something new that applies particularly to his product or operation?

Just leave the door open and a man will call to tell all about the new things—machines, materials and methods—in modern manufacturing. Often he will bring to your attention something that is "right up your alley". It is his business to know, and he is constantly on the lookout for new things you can use.

If you don't want to wait for his call, phone him.

Responsible

"This man" is an industrial distributor or a specialist in certain industrial items. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, bronze or Bearings, bronze. If he is the leading distributor, he almost certainly is the Bunting Distributor. He carries in stock for your money saving convenience Bunting Standard Stock Industrial Bearings, Electric Motor Bearings, and Precision Bronze Bars—ask him for catalog.

There are approximately 2000 Industrial Distributors serving every industrial section of the United States. In 1948 their total sales were more than $5,000,000,000. They carry an average inventory of $500,000,000, turn their stocks 5 to 6 times per year, fill 200,000 orders per day, have 12,000 outside salesmen and engineers, 10,000 inside telephone order expeditors, operate 8000 trucks delivering merchandise on which their average net profit is .0292 cents per dollar of sales.

Bunting®

BRONZE BEARINGS • BUSHINGS • PRECISION BRONZE BARS

THE BUNTING BRASS & BRONZE CO., TOLEDO 9, OHIO

Minimum Span, Oversize Casing Studs
Proof against cutting between stages depends on uniform pressure on gasket. On Warren TH Pumps, extra heavy bolting is especially close to channel rings and bolts are spaced and oversized to provide uniform pressure and lock flanges together for maximum strength. (Inner bolts 1⅜", outer bolts 1½")

Locked Channel and Case Rings . . .
Inter-stage seals or channel rings are not only wide to reduce by-passing between stages to minimum, but to make it possible to place casing bolts close to rings for maximum and uniform pressure on gasket. Double flange in lower half and single flange in upper half assures secure locking of channel and casing rings.

Genuine Kingsbury Thrust Bearing
Made by Kingsbury Machine Works, not modified type of other make. Oil cooled, heavy duty, duplex ball thrust bearing available and practical for discharge pressures 800 p. s. i. and lower.

Trouble-Free Solid Discharge Nozzle
Discharge nozzle is flared and extra heavy, with studs, instead of the conventional flanged type nozzle, thus eliminating danger of breakage.

Extra Heavy Casing Flanges . . . .
To provide freedom from warping, casing flanges are not only extra heavy but each bolting point is backed up with heavy boss, providing highest possible strength.

"Undercover" facts—

why WARREN six stage, type TH high pressure boiler feed pumps are a most dependable investment.....

There are many other important factors designed to provide a sound investment over the years. Evaluate the benefits and contact Warren on your next high pressure boiler feed job. Write for Bulletin 244 giving further details.

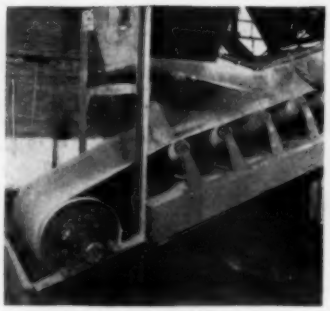
P-25

WARREN PUMPS

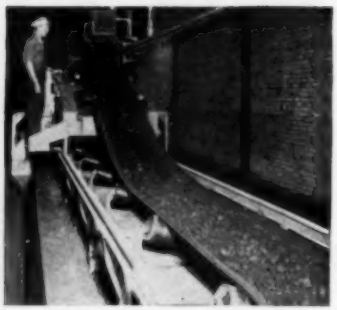
WARREN STEAM PUMP COMPANY, INC., WARREN MASSACHUSETTS

LINK-BELT engineering experience...

Belt conveyors deliver coal to storage yard and power plant.

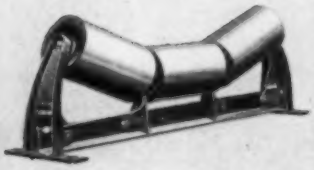


Chutes deliver graded coal to an ascending belt conveyor.

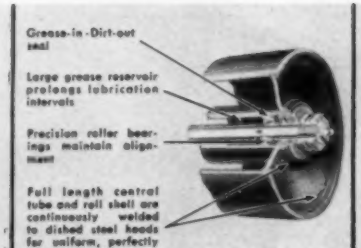


Distributing belt conveyor discharges coal to overhead bunker.

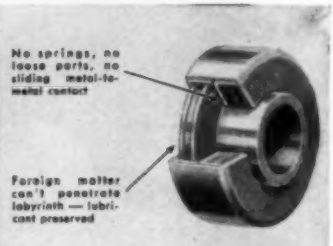
plus LINK-BELT quality components...



Standard for industry—L-B "100" Idler


Grease-in-Dirt-out seal
Large grease reservoir prolongs lubrication intervals
Precision roller bearings maintain alignment
Full length central tube and roll shell are continuously welded to dished steel heads for uniform, perfectly balanced strength

Less lubrication and adjustment


No springs, no loose parts, no sliding metal-to-metal contact
Foreign matter can't penetrate labyrinth — lubricant preserved

Grease-in-Dirt-out Seal

add up to your best bet in BELT CONVEYORS

In power plants all over the world, LINK-BELT Belt Conveyors provide reliable, efficient coal handling

Get the finest in modern coal handling in your power plant. It can be as simple as calling in a Link-Belt engineer while you're still in the planning stage.

Thousands agree Link-Belt builds the finest belt conveyors on the market today. More, it has the most complete line of components—all types and sizes—idlers, take-ups, pulleys, trippers, bearings and power transmission drives. Plus all related equipment—other types of conveyors, feeders, elevators, car dumpers and shakers, weigh larries.

Equally important, Link-Belt Belt Conveyor engineers can draw on the broadest coal handling experience in the industry. They'll work with you and your consultants—help you come up with the right system for your requirements.

Call or write the Link-Belt branch office nearest you for the services of a belt conveyor expert.

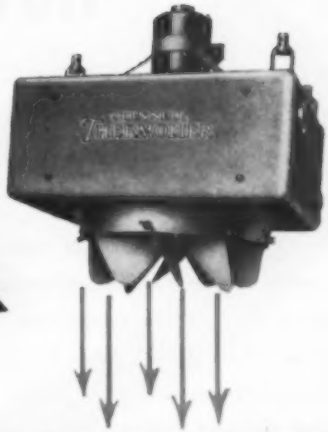
LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in Principal Cities.

DOWNRIGHT
better performance

Vertical Delivery
THERMOLIER
Unit Heaters . . .



RIGHT DOWN
where maximum heat is desired...

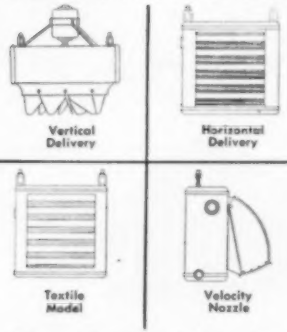
in warehouses, plants and other hard-to-heat buildings

HEATING COMFORT AND ECONOMY. Heat is forced down to the working level . . . not banked uselessly at the ceiling level. Thermoliers provide quick heating from a cold start. Desired room temperatures are easily maintained within a close range.

ADAPTABILITY TO EQUIPMENT AND FLOOR LAYOUT. The units and the simple piping are overhead where they do not interfere with arrangement of operating machinery or equipment and do not take up valuable floor or wall space. Units are easily relocated at any time to meet changes in plant layout or heating requirements.

LOW FIRST COST. Thermoliers are so efficient and so compact that their heating capacity is often equivalent to the capacity of cast iron radiation or pipe coils of twice the cost.

4 MODELS . . . . . 18 SIZES



A thermostatic trap, the simplest and least expensive of all traps, is practical because of Thermolier's exclusive cooling leg.

Maximum capacity assured, annoying destructive water hammer eliminated — by built-in pitch of tubes and internal cooling leg which assure continuous drainage of condensate.

Damaging strains caused by expansion and contraction eliminated by "U" type expansion tubes.

Safety and durability assured with leak-proof tube-to-header construction.

Five other important construction features. Write for Thermolier Catalog.

GRINNELL
WHENEVER PIPING IS INVOLVED

Grinnell Company Inc., Providence 1, Rhode Island • Sales Offices and Warehouses in Principal Cities

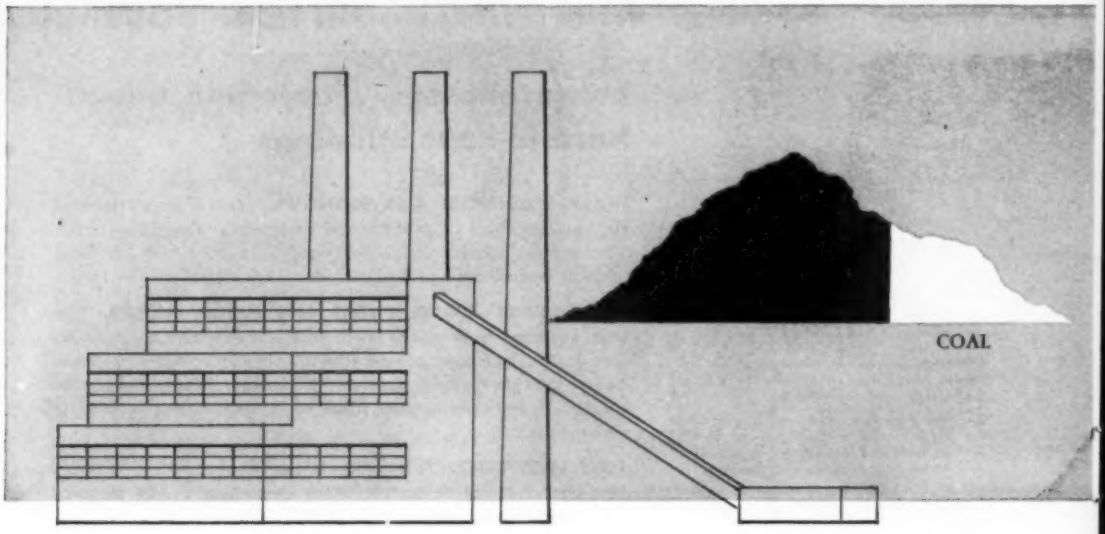
pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco humidification and cooling systems

How much fuel can you

When you buy a combustion control system, the second best system is not good enough. No matter what it costs, it is too expensive. Too little air means unburned fuel, while too much air means heat wasted up the stack. Slight variations in either direction can, in a few years, cost more in wasted fuel than boilers and control systems together.

Hagan Automatic Combustion Control Systems are designed for *precise* control. When they are placed in service, they are adjusted by Hagan's experienced combustion engineers, who make sure that you *get* the precision which is built into the Hagan control system.

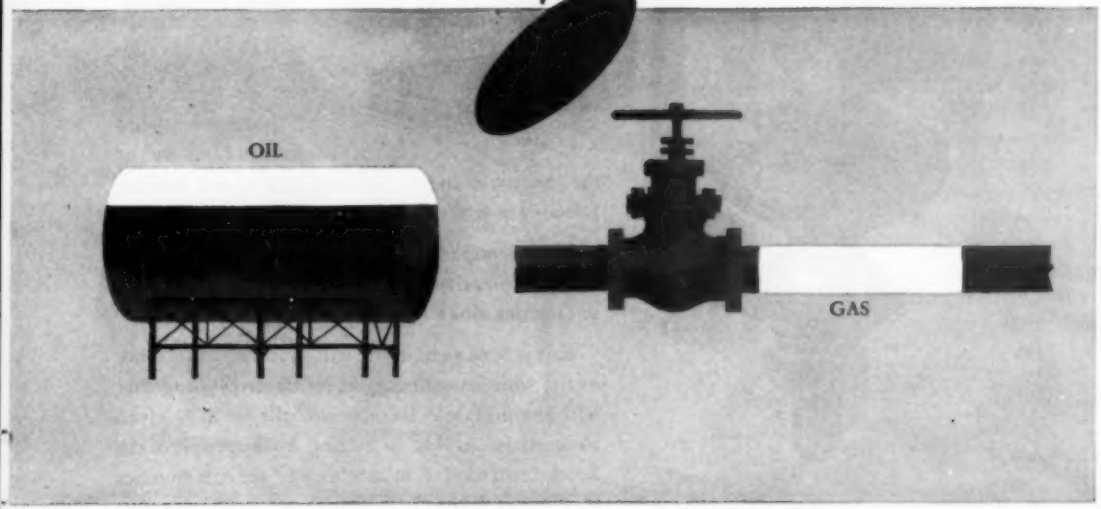
Hagan controls are used on every size of boiler from 5,000 pounds per hour at 3 psi. to 1,340,000



afford to throw away

pounds per hour at 1800 psi. They have been applied to boilers burning oil, coal, gases of various types, even on boilers burning sawdust —and always with satisfactory results.

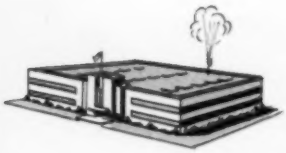
Our engineers will be glad to give you full information on Hagan control systems. Write to Hagan Corporation, Hagan Building, Pittsburgh 30, Pennsylvania.



HAGAN CORPORATION

BOILER COMBUSTION CONTROL SYSTEMS
RING BALANCE FLOW AND PRESSURE INSTRUMENTS
METALLURGICAL FURNACE CONTROL SYSTEMS
THRUSTORQ FORCE MEASURING DEVICES

Old Whistles for the New South...



WE just don't have the heart to silence the familiar "voices" of the many old steam locomotives that our modern Diesels are sending to the iron horse "bone yard."

So now we are giving the whistles from retired steam locomotives...as long as they are available... to factories along our lines that want them.

Call it sentiment if you will. But we like to think of the whistles of these old locomotives—together with the many old locomotive bells we have given to churches—as still "belonging" to the people of the South...still serving, in another way, the communities they served faithfully for so many years.

Ernest E. Norris
President

SOUTHERN RAILWAY SYSTEM

THE SOUTHERN SERVES THE SOUTH

your plant is as OLD as its wiring system!

You can have the newest and best machinery money will buy; you may have the newest in modern plant design—but if your wiring system is obsolete you still have an old plant.

Fast-moving, full-scale production is being stymied in 9 out of every 10 industrial plants by overworked, obsolete wiring systems.

Now more than ever, you should be utilizing all the power you pay for. A dependable, up-to-date wiring system eliminates power breakdowns, lost man-hours . . . and adds strength to our national production.

Determine the condition of your plant wiring system today. Call in your utility, plant or consulting engineer or electrical contractor and arrange to have him survey your plant. And, most important of all, send for your free copy of *"Power Up—And Be Prepared."* This complete modern wiring guide shows you how efficient wiring systems cut down expenses and build up your power efficiency. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. 61339

the right cable for the job

ANACONDA®

WIRE AND CABLE

BERKELEY WATER SYSTEMS

COMBINATION TURBINES

BERKELEY OFFERS A COMPLETE LINE

- Pressure Systems
- Combination Turbines
- Irrigation Turbines (Water and Oil Lubricated)
- Sprinkler Pumps
- Non-Clog
- Vertical and Horizontal Circulating Pumps
- Propeller Pumps
- Self Prime Contractors' Pumps
- General Purpose
- Sump Pumps
- High Pressure Motor and Engine Drive Pumps
- Canal Pumps

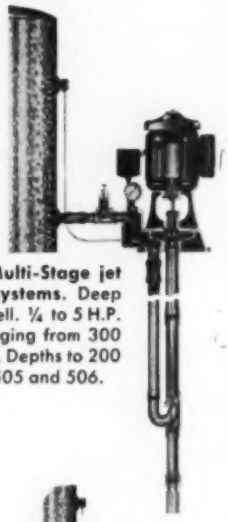


FIGURE 1
Single and Multi-Stage jet type water systems. Deep and shallow well. ¼ to 5 H.P. Capacities ranging from 300 to 4000 G.P.H. Depths to 200 feet. Bulletins 505 and 506.

FIGURE 2
MID-JET: A high quality, low price, complete pressure system with patented built-in tank. Easy to install—pipe up, plug in, that's all! 300 G.P.H. at 20-40 lbs. pressure from a 15 foot water level. May be adapted for deepwell operation. Write for Bulletin 509.

FIGURE 3
Extra Deep, Extra Steep "200 Series" jet pumps. The newest addition to the Berkeley line. Pump from 260 feet with 47 lbs. discharge pressure—630 G.P.H.! Overall range: 1 to 5 H.P., 80 foot to 300 foot pumping levels, discharge heads to 600 feet, 300 to 1000 G.P.H. Bulletin 510.

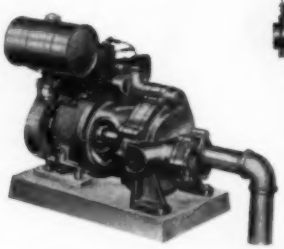


FIGURE 4
Engine or Belt Drive Jet Pumps. Deep or shallow well. Depths to 200 feet — capacities to 5000 G.P.H. Write for Bulletin 507.

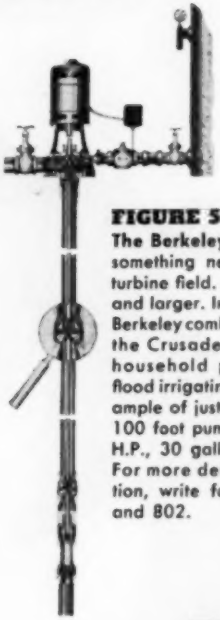


FIGURE 5
The Berkeley Crusader . . . something new in the small turbine field. For 4 inch wells and larger. Incorporating the Berkeley combination feature, the Crusader will maintain household pressure while flood irrigating. Here is an example of just one pump unit: 100 foot pumping level, 1½ H.P., 30 gallons per minute. For more detailed information, write for Bulletins 801 and 802.

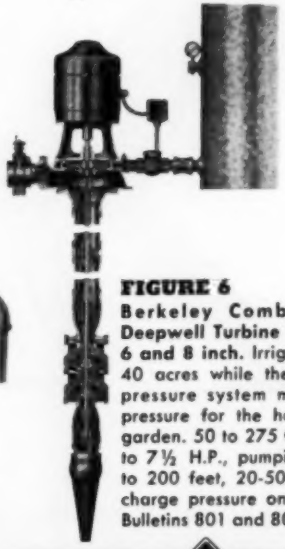


FIGURE 6
Berkeley Combination Deepwell Turbine Pumps—6 and 8 inch. Irrigates 4 to 40 acres while the booster pressure system maintains pressure for the house and garden. 50 to 275 G.P.M., 2 to 7½ H.P., pumping levels to 200 feet, 20-50 lbs. Discharge pressure on booster. Bulletins 801 and 802.

BERKELEY PUMP COMPANY
829 BANCROFT WAY, BERKELEY 2, CALIFORNIA · DEPT. M
556 TIFT AVE., S. W., ATLANTA, GEORGIA · DEPT. M

BERKELEY IRRIGATION PUMPS
SPRINKLER and DEEP WELL TURBINES

FIGURE 7
Berkeley Overhead Irrigation Pump with ball bearing bracket. Belt or coupling drive.

FIGURE 8
Direct mount engine drive. This unit mounted on truck or trailer makes an ideal portable sprinkler rig.

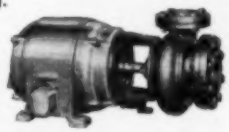


FIGURE 9
For permanent installations, Berkeley Overhead Irrigation pumps may be directly mounted on electric motors.

FIGURE 12
Single and multi-stage General Purpose Pumps. Capacities to 2000 G.P.M. Heads to 500 feet. Motor, engine and belt drive. Write for Bulletins 603 and 722.

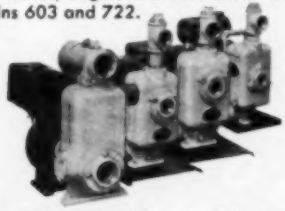


FIGURE 13
Self-prime Contractors' Pumps—1½, 2 and 3 inch. Unique recirculation valve insures quick priming. Capacities to 350 G.P.M. Heads to 80 feet. Bulletin 630.

OVERHEAD IRRIGATION PUMPS PERFORMANCE TABLE
(Figures 7, 8 and 9)

Write for Bulletin 653

MODEL	G.P.M.	HEAD FEET	B.H.P.	RATING CURVE No.
1½ ZRC	30 to 80	50 to 150	1 to 5	C-190
2ZRLD	50 to 150	50 to 150	1 to 7½	C-489
2ERD	100 to 250	60 to 200	2 to 15	C-197
2½ZRE	130 to 300	60 to 190	2 to 15	C-382
3ERE	250 to 600	60 to 200	5 to 25	C-384
4ERE	350 to 900	60 to 190	7½ to 40	C-386
*4GRG	350 to 800	90 to 180	15 to 50	C-199
5JRJ	500 to 1300	80 to 190	25 to 80	C-198
6NRJ	800 to 2000	100 to 200	40 to 100	C-480
8NRJH	1800 to 4000	80 to 190	50 to 175	C-647

* 4-inch Heavy Duty Construction

FIGURE 10
Deepwell Turbines — oil or water lubricated. 150-3000 gallons per minute. Depths to 500 feet! Available with enclosed or semi-open impellers. Bulletin 811.

FIGURE 11
Propeller Pumps. High capacity, low lift. For flood irrigation from canals, rivers, lakes, etc. 1000 to 6000 G.P.M. 5 to 20 ft. head. Bulletin 852.

BERKELEY PUMP COMPANY
829 BANCROFT WAY, BERKELEY 2, CALIFORNIA · DEPT. M
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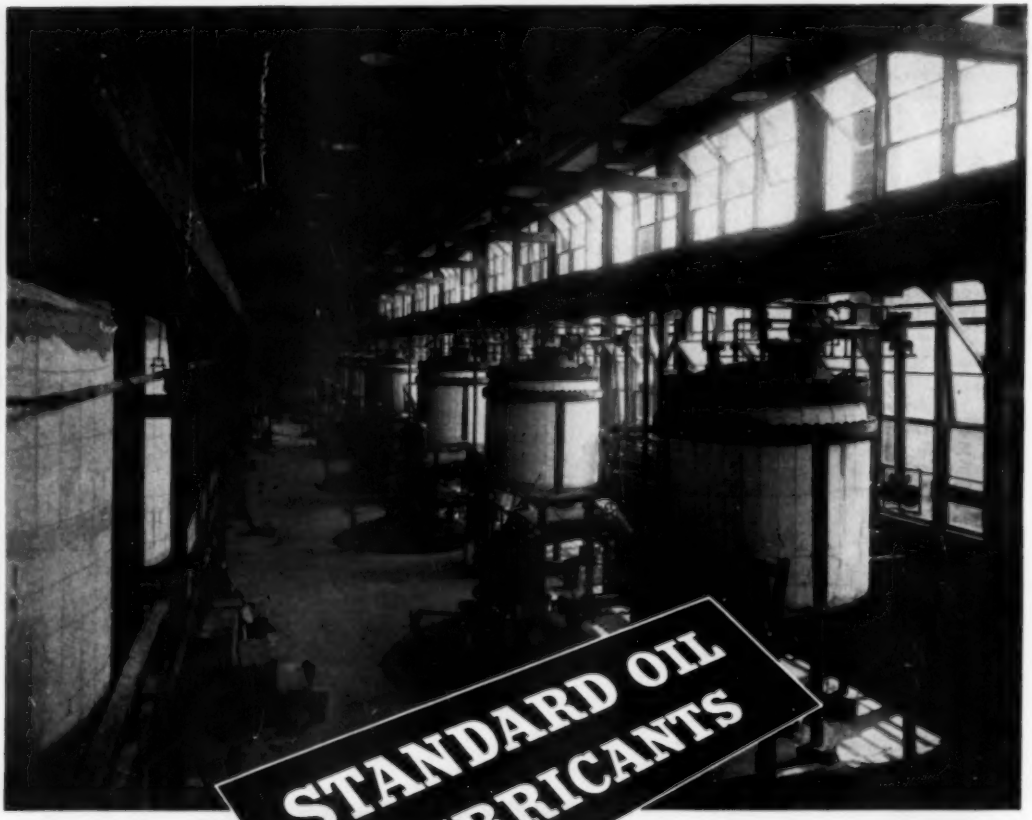
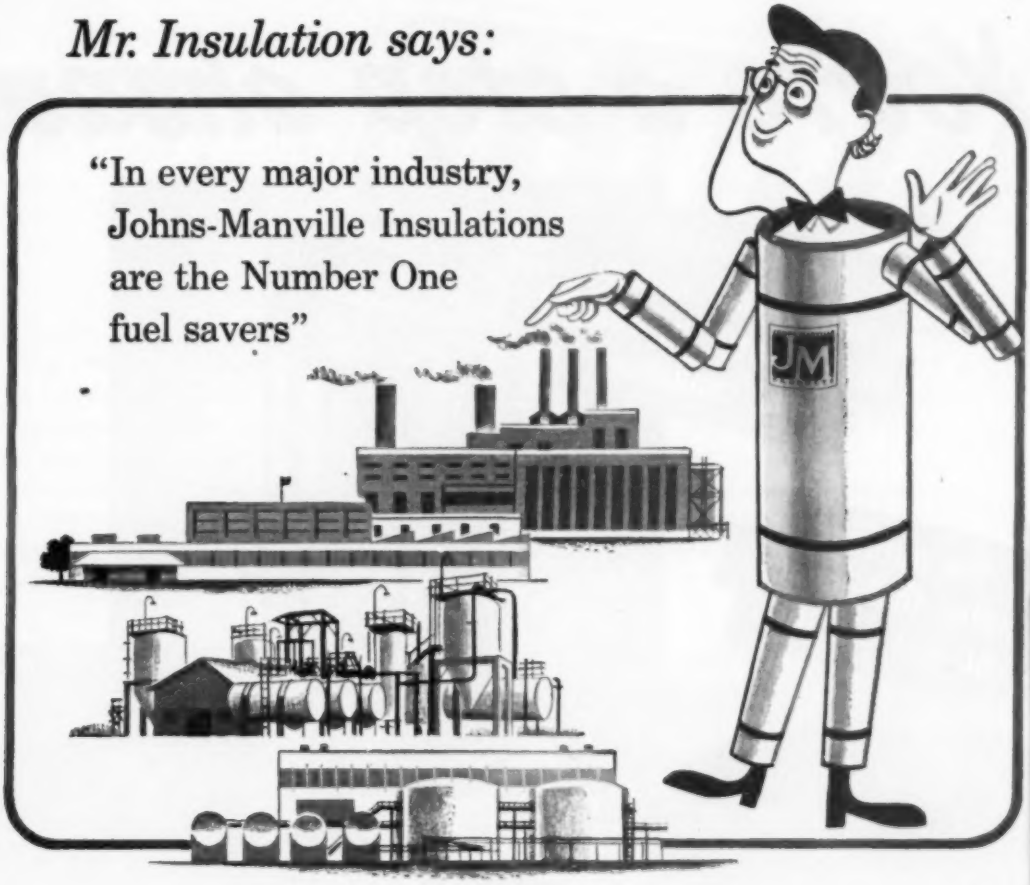
problem solver

Modern science has recently developed a remarkable electronic device capable of solving highly *mathematical* problems infinitely faster than human mathematicians. ... But when it comes to solving problems pertaining to industrial *lubrication,* your best bet is still your Standard Oil lubrication representative. ... He is a product of practical experience and thorough training. Furthermore, he is backed by combined facilities for the research, testing and engineering of industrial lubricants that are *unequalled.* ... These facilities, and the services of our engineers, are available to you without cost or obligation to assist you with your lubrication problems. If you are not now using Standard Oil industrial lubricants, it will most certainly pay you to get in touch with your nearest Standard Oil representative today.



STANDARD OIL COMPANY (KENTUCKY)

Mr. Insulation says:



IN PLANTS with stacks or stills, tanks or towers, the story is the same—"Insulation by Johns-Manville" means the maximum return on your investment. There are two good reasons for this:

1. YOU GET THE RIGHT *MATERIALS*—From asbestos and other selected raw materials, Johns-Manville manufactures a wide range of industrial insulations for service from 400F below zero to 3000F above. If you need engineering advice in determining exactly the right one for your job, you can get experienced and authoritative assistance from your local Johns-Manville insulation engineer.

2. YOU GET THE RIGHT *APPLICATION*—Even correctly selected insulation needs proper application to permit it to serve at peak efficiency through the years. Here you can always count on J-M Insulation Contractors and their highly skilled mechanics. These organizations are trained in Johns-Manville application methods, and have generations of insulation experience behind them.

Why not get the complete picture? Call on insulation headquarters when your next job is in the planning stage. Just write Johns-Manville, Box 290, New York 16, N. Y.

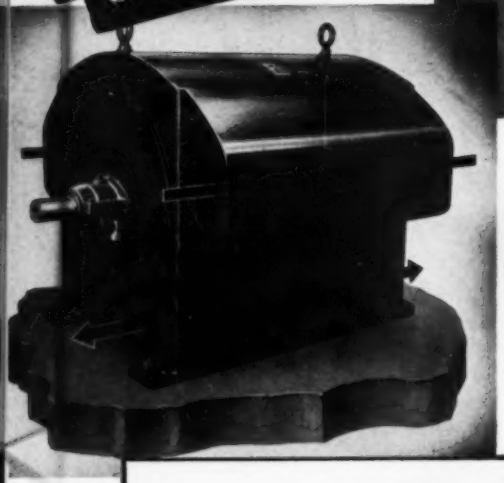
JM

Johns-Manville *first in* **INSULATIONS**

You're a step ahead

the deaerating heater that makes unnecessary the tubular vent condenser

the outdoor motor that laughs at wet weather



the high pressure turbocharger that further boosts diesel power

The Elliott Line-up

TURBINE-GENERATORS
DEAERATING HEATERS
GENERATORS FOR DIESELS, ETC.
TURBOCHARGERS FOR DIESELS
CENTRIFUGAL BLOWERS
CONDENSERS
MECHANICAL DRIVE TURBINES
STEAM JET EJECTORS
STRAINERS
TUBE CLEANERS
MOTORS—(Integral, Crocker Wheeler Div.)
(Large, Ridgway Div.)

with... ELLIOTT

Getting the jump on the field has become a tradition with Elliott engineers. As for instance in the development of heavy, high-speed centrifugal blowers . . . the pioneering of deaeration and the development of its equipment . . . the initiating of an entirely new technique as applied to the fabricating of steel in large motors and generators . . . the skillful designing of a turbine line which brings the advantages of standardization to practically any special application . . . the recognition of supercharger possibilities for diesels, and the combining of Elliott skills in the development of a highly successful turbocharger.

These, and other similar achievements make the big "E" in the familiar trade mark symbolize Exceptional Excellence in Engineering, as well as the name ELLIOTT.

the mechanical drive turbine that makes standardization flexible

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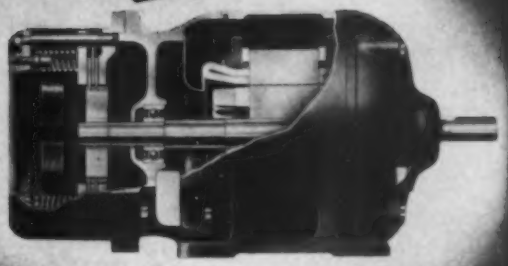

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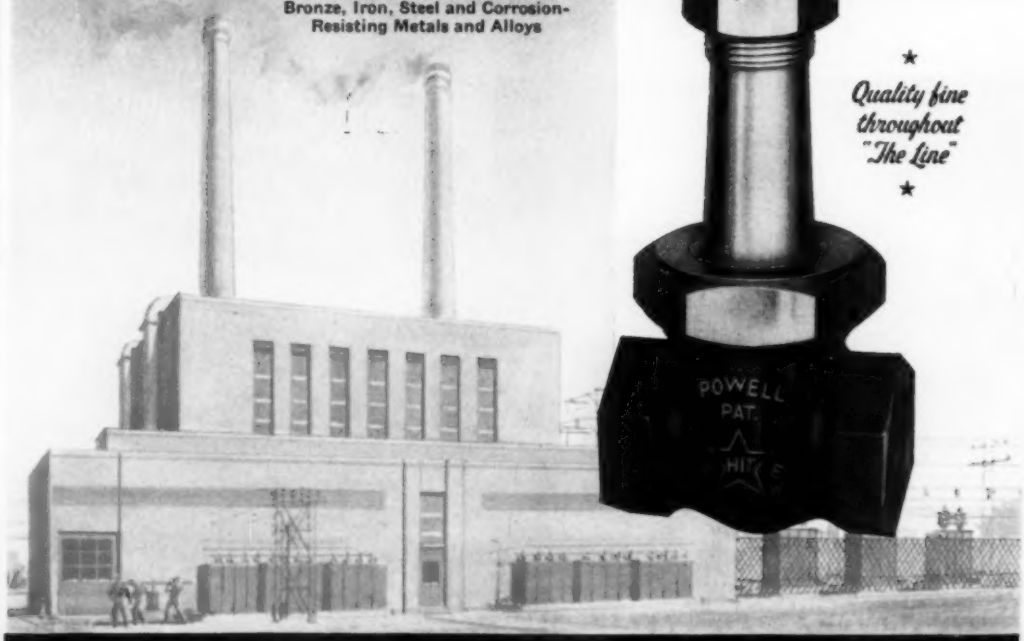
Gate, Check, Globe and Y Valves, in Bronze, Iron, Steel and Corrosion-Resisting Metals and Alloys

Fig. 375. Small 200-pound Bronze Gate Valve with renewable, wear-resisting "Powellium" nickel-bronze disc.

★ *Quality fine throughout "The Line"* ★



POWELL

The WM. POWELL CO., 2525 Spring Grove Ave., P. O. Box 106, Station B, Cincinnati 22, Ohio

Industry Speaks

Rubber Industry in Unique Position

AS a result of two wars in ten years, the rubber products manufacturing industry now finds itself in an unique position among major industries.

The government owns the rubber producing plants, procures the raw materials and schedules production, is the only buyer and importer of crude rubber, determines the amounts of rubber that may be consumed by manufacturers, sets the specifications for the use of rubber and determines the price.

Declaring that the rubber industry is completely "socialized" in the fields of rubber supply and usage, *John L. Collyer*, president of *The B. F. Goodrich Company* has called for appointment by the President of a Special Commission to study the problem and develop a policy of competition in rubber.

"Today the goals of accumulating a stockpile of crude rubber adequate to meet the nation's military and essential civilian requirements for a five year war, and the reactivation of our man-made rubber industry capable of producing more than a million tons of rubber a year, have been achieved."

Mr. Collyer recommends the establishment of a time table for termination of government control of crude rubber purchasing and over consumption of rubber for civilian purposes; accumulation of a 200,000 long ton stockpile for military security; limitation of active participation in the field of rubber to the maintenance of strategic stockpiles after accumulation of the stockpile of man-made rubber has been accomplished; and government assurance that strategic stockpiles of crude and man-made rubbers will be employed only for military and essential civilian security and will not be used to manipulate rubber prices.

Scrap Drive More Than Patriotism

INDUSTRY is not looking upon the scrap drive purely as a patriotic gesture. The pressure being applied to "get out the scrap" is serving as the incentive for a much needed clean-up. In nearly all instances the clean-up is worth more than the cash received for scrap and the contribution to increased steel production is a net bonus.

Southern and Southwestern industrial plants report the following benefits from such a program:

1. Finding needed items that have been buried
2. Better availability of items that are to be retained
3. More room for live storage
4. Better safety for workers through getting rid of the clutter
5. Reduced strain on structures by removal of unneeded elements
6. Better production because of increased elbow room

These plants advise that it is a good procedure to allow each department to handle its own clean-up. The operators are tired of looking at a lot of the junk that has "been held for future use," and will do a thorough job of packing it out to the yard where the salvage committee makes final decision on disposition of it.

So, move out the junk—old replaced machinery and equipment, structural parts and other "heavy" scrap.

Research for Light and Vision

A STUDY made to determine the amount of "effort" an industrial worker puts forth in seeing a particular task was discussed by *Willard Allphin*, supervisor of commercial engineering fixtures of the *Sylvania Electric Products, Inc.*, before the National Technical Conference of the Illuminating Engineering Society in Washington.

The most promising method for attempting to measure the "effort" of seeing is by studying the muscle action from the forehead where tiny voltages are produced by muscles when doing work.

Test was made in a factory manufacturing electronic equipment where female operators form a shaped bend with tweezers in a "cat whisker" for a silicon diode detector.

Sponge type electrodes are held on the forehead of the operator by means of a headband. The "effort" used by the operator can be recorded. As a result of the test, lighting for this job would require 1,200 footcandles to give the operator sufficient illumination.

Atomic Power in Industry

TECHNOLOGICAL and economic angles of nuclear energy development were discussed for more than 500 engineers and scientists who attended the third annual *Oak Ridge Summer Symposium* at the Atomic Energy Commission's Oak Ridge, Tenn. site August 27-Sept. 7.

Dr. C. G. Suits, Director of Research for General Electric Co., said the production of both power and plutonium in specially-designed reactors now seems feasible, and he predicted greatest utilization of nuclear power in such industries as aluminum and iron and steel. Cost estimates offered by Dr. Suits were based on the relatively early development of by-product power with a military subsidy.

"The high-temperature power breeder reactor, which would utilize substantially all the heat and all the fuel, must be regarded as the logical objective and challenge to the atomic industry in the years immediately ahead," Dr. Suits declared.

Dr. Lawrence R. Hafstad, director of the Commission's division of reactor development pointed out that military needs have shifted reactor development from long-term to short-term objectives, and this continuing military demand for fissionable materials is making by-product power production more promising. Even in peacetime a private power-producing reactor industry is likely to be government-subsidized because of its wartime potential, he predicted.

Major problems in nuclear engineering are found in material development, equipment design, fuel and product processing and control and safety requirements, according to *James A. Lane*, principal development engineer in the Oak Ridge National Laboratory reactor technology division.

For Many Services

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CHAPMAN LIST 960

...In these different alloys

- Carbon steel forgings with stainless steel (12-14 chrome) trim.
- Stainless steel (12-14 chrome) forgings with stainless steel (12-14 chrome) trim.
- Stainless steel (18-8) forgings and stainless steel (18-8) trim.
- Alloy steel (4-6) chrome body forgings with stainless steel (18-8) or Cyclops trim.

To all the many jobs for which it's qualified, Chapman List 960 brings *extra* wear-resistance in exclusive features like these:

Extra strength of stem-and-wedge gate connection provides protection against even unusual service stress.

Super-hardened seat rings and wedge-faces of stainless steel.

Bolted Follower with no follower threads on yoke to corrode. Follower easily tightened down any time when necessary.

List 960 comes in sizes from ¼" to 2". Joints either gasketed or metal-to-metal. Two types: Rising stem with yoke (shown), or rising stem with inside screw. Pressure range: 2000 lb. at 100°F.—380 lb. at 1000°F. (For higher pressures, specify List 990.) Send for illustrated bulletin on List 960.

The CHAPMAN Valve Manufacturing Company

INDIAN ORCHARD, MASSACHUSETTS

Timely Comments

Better Production

MARINE engineers talk a lot about the "shake-down" cruise—the first full test of a new ship on the high seas. Industrial plants are subjected to comparable tests, but for them the shake-down never ends. Each year, many improvements and replacements are made. Most industrial men are convinced there never has been a perfect production record; never has a plant been built that cannot be improved.

Major plant investments are figured in thousands or millions of dollars, but the best improvements insofar as return on investment is concerned are frequently small in capital cost. Their incorporation into the plant is more of a strain on the brain than on the pocketbook.

A small betterment of performance at a bottleneck position in a large plant may prove astounding if evaluated at its true worth. Here is an example. Suppose a ten million dollar plant is designed throughout for a certain maximum rate of production. There is a top speed at which the machines may safely operate. But because of imperfect regulation, speeds cannot continuously be held right at maximum. The controls are set just so the highest speeds are within limits and the minimums are a little lower. Obviously the average speed in this case is somewhat below optimum.

For our example we will say the average speed is 4 per cent below maximum. Then by thorough study it is found that for $10,000 better controls can be installed. For $10,000 average speeds can be held within 3 per cent of maximum rather than 4 per cent. That means approximately 1 per cent more production; about 1 per cent increase in plant capacity.

Now we can list some of the money benefits of the improvement.

1—The plant cost $10,000,000, and 1 per cent of that is $100,000 equivalent in new plant value; which at 10 per cent is worth $10,000 per year.

2—The payroll for a $10,000,000 plant might well be $2,000,000 a year. One per cent of that is $20,000.

3—Other operating cost, not dependent on quantity of product produced, would be perhaps $1,000,000. One per cent of this is $10,000.

Adding the above items, we can credit $40,000 per year to the $10,000 investment in speed controls. The investment would be paid out in three months.

Looking at the advantages of such an improvement in another way, we might consider only the net profit on additional product. For a $10,000,000 plant the yearly net profit on 1 per cent more finished product might reach $50,000. In any event the return on the original $10,000 investment would be enormous. A few comparable improvements can substantially increase the year's net earnings.

Perhaps the above example is extreme, but certainly it is within the bounds of reason. Probably no one change would result in a full 1 per cent increase for the average plant. But very likely a large number of minor improvements perhaps each costing much less than $10,000, can be made even in the best managed plants. The idea is the same. Anything that can improve production only a little is of big value in overall industrial economy.

Better materials handling, better lighting, better power and steam supply, better regulation. All of these things, and many more, constitute a continual challenge to the plant engineer and the operating force.

That is why SPI devotes one full issue each year to BETTER PRODUCTION. The editors know, and the readers know, these small items are important. In this issue approximately 100 short articles show what has actually been accomplished through moderate improvements in specific Southern plants. Individually, the ideas are small, but collectively they are big. We believe every reader can find here at least a few suggestions that will help improve the net earnings of his company.

Section 1

Materials Handling

Handling sugar without pallets . . fork truck utilization . . Tramrail bridge system . . rivetless chain conveyor . . mobile crane powered by welder . . versatile furniture conveyors . . ten year service record set by 1275 ft conveyor . . handling acid . . monorail installations

Case 1—Florida Sugar Mill

Shipping Costs Cut 75 Per Cent

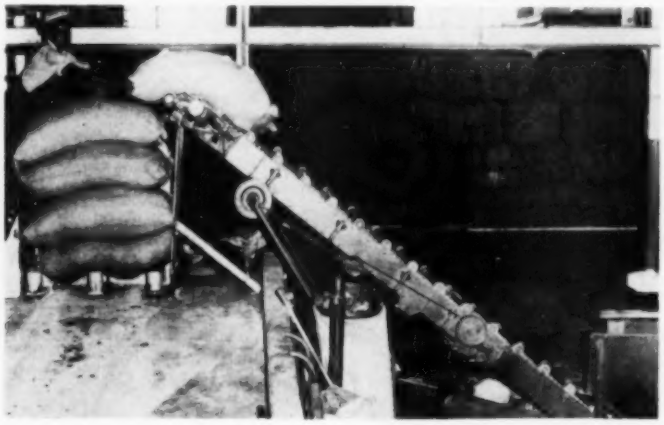
THE U. S. Sugar Corporation of Clewiston, Florida, by utilizing fork trucks in transporting bags of sugar from packaging operations to freight cars, and in stacking bags within the freight car, has cut the cost of shipping operations by three-quarters. A "homemade" catch-bin situated on the shipping-platform is an important element in the design of this handling system.

The Old System

Under the old system, bags were placed inside the car by means of a conveyor, and were stacked by hand. Approximately 22 work hours were required to load a car under this system.

In addition to the savings in cost, the new system has resulted in less confusion during shipping operations, less damage to packaged produce, and faster loading time.

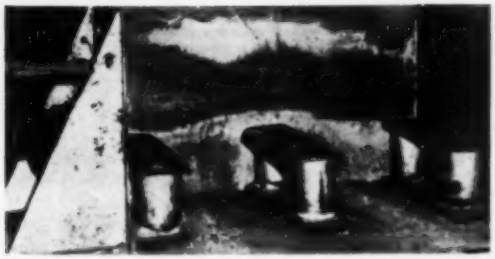
This plant operates 24 hours a day, ten months per year. Two fork trucks are in use at the plant, although only one at a time is used in this operation. While one is being used in the shipping department, the other is being used on warehousing and other jobs. Having two trucks available is also an advantage in planning maintenance and charging schedules.



From Packaging to Catch-Bin

Sugar is dumped from an overhead hopper-and-scale into burlap bags holding 300 lb each. Filled bags are then sewn up by automatic machines and conveyed up to the shipping platform level. Bags travel on end while being filled and sewn and are held up by railings on both sides of a 30 ft conveyor.

A 15 ft inclined conveyor carries the bags up to the catch-bin on the shipping platform. Bags are turned over on their sides as they reach the inclined conveyor and are positioned so they will stack properly in the catch-bin.



From Catch-Bin to Freight Car

From the end of the inclined conveyor the bags are stacked four and five high in the catch-bin for pickup by fork truck. Bags rest on three spring mounted members spaced about 12-in. apart. The forks of the truck can thus enter between the bags and the floor and pick up the sugar *without the use of skids or pallets.* Sheet metal plates form the sides of the bin and prevent bags from toppling while being stacked. Notice also the special platform that has been built for the attendant to stand upon.

Stacks of bags are taken by a 2000 lb capacity Yale & Towne Mfg. Co. fork truck from the catch-bin into freight cars, approximately 30 ft away, for shipment. In loading freight cars, the

truck enters the car, deposits the bags, withdraws the forks, and returns for another load. Stacks of five bags are placed on the floor of the car and then topped with stacks of four bags. Using this system 300 bags are loaded into each car. From weighing through shipping, 40 tons, or about one freight car load, can be handled in about five man hours. In a one-year period 94,000 tons are handled in this manner.

Case 2—Tennessee Fabricator

Small Plant Tackles Handling in Big Way

WESTERN Union Telegraph Company's Chattanooga, Tennessee, plant is small both in size and in output, but this has not deterred the company's management from applying big ideas to reduce its handling costs.

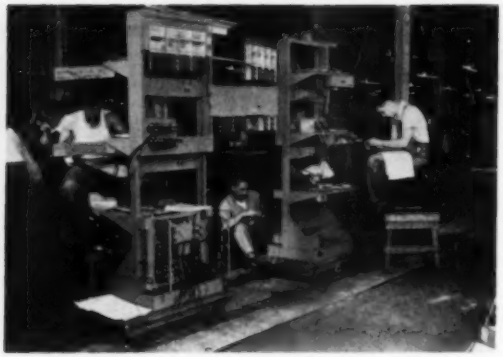
The plant is an assembler of switchboards, cabinets and tables used in telegraph operations—many of which are specially designed for Western Union's own particular use. Although total monthly production is limited to a relatively small number of units, many of the techniques used in larger companies to eliminate unnecessary handling are in use here. Despite the relatively short length of the production line which measures only 550 ft, careful attention has been given to plant layout so that virtually a straight-line production sequence is obtained.

Equipment is used with maximum effectiveness. Hoists are employed at all points where heavy loads or materials must be lifted or positioned, while hand operated skid handling trucks and a 2000-lb capacity electric fork truck moves all items which range in weight from about 50 to 2000 lb.

Larger units such as the illustrated two high speed message center racks are placed on industrial truck dollies. The dollies move the units through the various production phases involving assembly, wir-

Large crates are handled both in receiving and shipping with the Baker electric fork truck shown below. Before the truck was used, three to four men were needed to move these crates, which weigh up to 1600 lb.

A 2000 lb reel of cable (below right) being loaded on a highway truck is another strenuous and dangerous job which the fork truck has eliminated. The job is now performed in a fraction of the time formerly required.



A moving production line technique is used even for such "slow" units as these high speed message center racks which are moved on industrial truck dollies through assembly, wiring and testing.

ing and testing. The completed units are then lifted from the dollies by the fork truck and placed in crates for shipment.

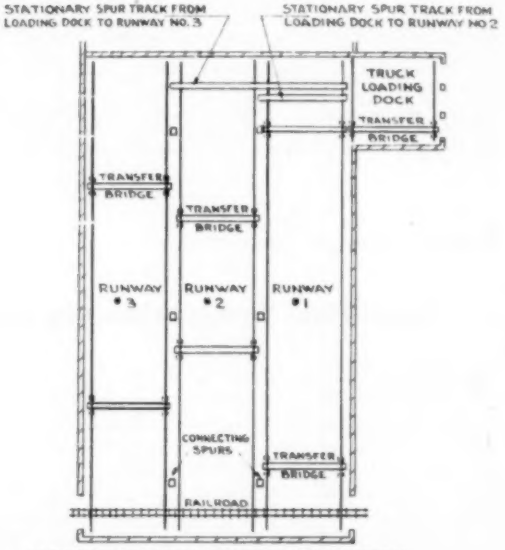
This truck, made by the Baker Industrial Truck Division of The Baker-Raulang Company, Cleveland, Ohio, is used in such other applications as unloading incoming crates, boxes and cartons of raw material; loading highway trucks and railroad cars; and in transporting heavy material to production.

Case 3—Texas Warehouse

Handling Simplified by Tramrail Installation

The entire floor area of Metal Goods Corporation's warehouse, including the truck loading dock at the side of the building and a railroad spur at the end, is covered by a Cleveland Tramrail transfer bridge system. System is so flexible in layout that it not only can convey materials in several parts of the building at the same time, but can handle materials at trucks and railroad cars simultaneously.

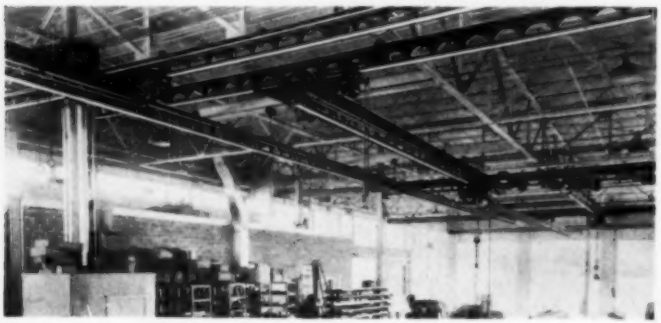
The sketch shows the transfer bridge system as installed in 1946. Minor bridge modifications were made in 1950. Metal Goods had four hoists used on the seven bridges. Most of their in and out stock is carried in the outside two bays while the center bay is used to store slower moving items and over-flow materials. Second bridge has now been taken out of the inside bay and is used primarily around the loading dock. This enabled Metal Goods to keep one bridge at the back of the building where all of the unloading is done from railroad cars.



CLEVELAND TRAMRAIL TRANSFER BRIDGE SYSTEM

METAL Goods Corporation, with branches in St. Louis, Tulsa, Dallas, Houston, Kansas City, Denver, and New Orleans, is one of the Southwest's leading metal distributors. Handling is simplified in the company's huge Dallas, Texas, warehouse by an extensive Cleveland Tramrail installation.

General view of Tramrail bridges, truck loading dock and three door openings at the Metal Goods Corporation at Dallas, Texas. Building consists of three bays, 45 ft x 380 ft, and truck loading dock 45 x 60 ft.



Seven interlocking, fully motorized, push-button-operated, floor controlled bridges handle a vast variety of light metal plate, strips and shapes. There are three main runways, running the length of the warehouse, and a fourth runway in the section enclosing the truck loading dock.

A load can be picked up at any point in the building and quickly delivered to any other point or placed into a railroad car or truck without rehandling, because the

electric hoist carriers can be quickly transferred from one bridge to any other bridge.

Of interest are the stationary spur tracks from the truck loading dock to runways numbers 2 and 3. These permit quick transfer of a hoist carrier with a load from the dock to a transfer bridge on either runway 2 or 3. Should the load be going to a point covered by runway 1, a transfer bridge on this runway is interlocked directly to the dock transfer bridge.

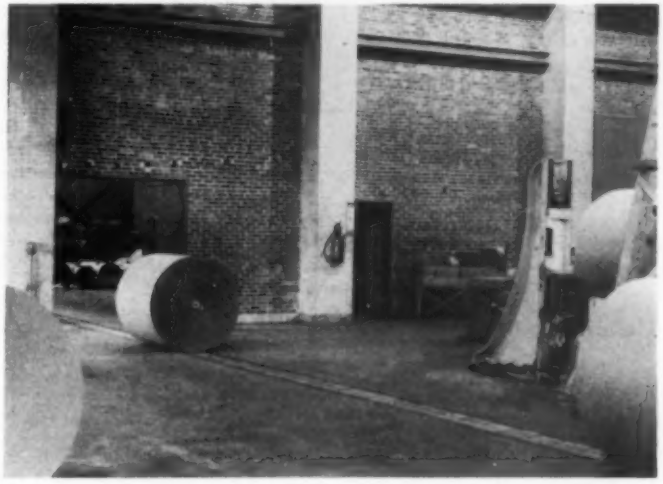
Case 4—Florida

Chain Replaces Gravity Roll Conveyor

IN this large Florida paper mill, rolls of paper, previously handled on gravity rolls, are now easily and quickly rolled from rewinder and slitter onto Link-Belt "Rivetless" chain conveyor for delivery into storage room, for storage or for transfer downstairs by a tray-type lowerer to shipping department. Rolls weigh up to 3200 lb.

Conveyor, 140 ft long, has oak pallets mounted on the chain. Edges of pallets slide on steel tracks under floor, in the same trench that formerly contained the gravity roll conveyor. Conveyor is operated intermittently by push button.

Link-Belt Rivetless chain conveyor in Florida paper mill.



Case 5—Virginia

Ship Unloading Mechanized

THE Virginia Carolina Chemical Corporation utilizes a fleet of more than 150 Hough "Payloaders" in its plants.

At the Wilmington, Delaware plant, one of the many tasks performed by a Model HA "Payloader" is the unloading of sulphur from the holds of incoming freighters. Truck, lowered into the ship's hold, loads the material into tubs which are subsequently hoisted up to the fertilizer department. When engaged in this operation, the truck is used continuously 38 to 45 hours.

Stevedoring operations such as this are becoming increasingly prominent in the handling of coal, sulphur, salt, ore and other bulk materials aboard ships.

A Frank G. Hough Company "Payloader" unloads sulphur from the hold of a freighter at the Virginia Carolina Chemical Corporation.

Case 6—Florida

Welder Powers Mobile Crane

A DOUBLE bull's-eye is scored by the Matt G. Reeves & Company, Tampa, Florida, in getting maximum use from equipment and tools. This company makes and erects steel portable bleachers and grand stands, as well as erects chain link fences. To move steel about their yard and factory the company, at a surplus army sale, purchased a self-propelled crane with a boom that raises and lowers and swings about 270 degrees. To put the crane in operation, however, required an investment in batteries and charger that would have been three times more money than the crane cost. A consultation with an electrican proved that one of the company's 200 amp air-cooled engine driven Lincoln welders would do the job.

The welder was mounted without alteration in the battery space on the crane and now supplies power to the motors that propel the crane and operate the boom. The crane moves material about the factory and yard for prefabricating the bleacher sections.

It is also put into a 1½-ton truck and taken out on erection jobs where it is used off the back of the truck both to place steel for erection and weld it. The crane also comes in handy as a welder occasionally in the shop when production schedules are tight. The unit is driven into the welding department where it serves as a welding machine.

A Lincoln Electric 200 amp air-cooled engine driven welder powers this mobile crane at Matt G. Reeves & Company at Tampa, Florida.

Case 7—North Carolina Furniture

Conveyors for Furniture Manufacturers

SOUTHERN furniture manufacturers have used standard types of conveyors for many years in applying the final furniture finishes. But only recently have conveyors been modified and adapted especially for this purpose.

The DeBurgh patented conveyor manufactured by George Koch Sons, Inc., and sold by Redman Engineering Service of High Point, N. C., brings the work to each operation on a stable platform and at a convenient height. This is in contrast to the conventional overhead trolley type conveyor where the furniture swings in a cradle. The accompanying photographs show the equipment employed in a Southern operation.

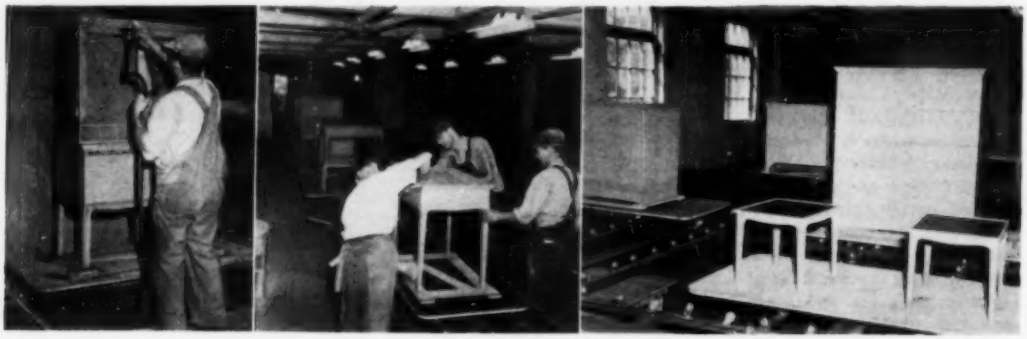
Versatility

The system is applicable to small plants as well as large. Satisfactory installations are serving in plants where production is as low as 60 pieces and as high as 600 pieces of furniture finished in an 8-hour day.

Damage Minimized

An average production of 300 pieces of case goods furniture requires a crew of men to move about 250 tons of furniture a day, shoving it from one operation to the next with great liability to scratch and mar it in so doing. This can all be done with a conveyor and a two horsepower motor, and at the same time eliminate possibility of damage because no two pieces can

The spraying operation shown at left takes place at a convenient height, and the pallet and its load may be readily rotated on the swivel casters. The center view shows the sanding operation, and here again the work is on a stable (non-swinging) base permitting faster and better workmanship. A Draw-Off Station is shown at right. This unique feature permits any special extra long time operation to be performed without interfering with normal conveyor speed and operation. Such items are loaded at approximately the same time interval as is required by the special operation



contact each other on pallets.

By running the conveyor in and out of correctly designed drying ovens, the entire finishing operation is speeded up, worker fatigue is greatly reduced and a better finish is secured. To this must be added the final advantage of increasing output a conservative 50 per cent with the same crew, or holding the original output with a similar reduction in working force.

Case 8—Arkansas Lumber Mill

Ten Year Production Service From Lumber Conveyor Belt

Thirty inch conveying belt, traveling over 1,275 ft at 400 fpm, has handled 275 million ft of rough green lumber.

Lumber comes out of the sawmill onto the live rolls, then to the conveyor belt. Belt and live rolls are running on approximately the same level.

ONE of the longest green lumber conveying belts in the country is operated by the Bradley Lumber Company of Warren, Arkansas. The 30-in. belt, installed over 10 years ago by The Riechman-Crosby Co., Memphis, Tennessee, distributors for the Republic Rubber Division of the Lee Rubber and Tire Corporation of Youngstown, Ohio, is a 5 ply (3/16 top—1/16 bottom) 32 oz Republic Record Maker, 1378 ft long.

The belt, powered by a 15-hp motor, travels 1276 ft over a log pond before going under railroad tracks, and then up a gradual incline to the green lumber sorting chain, where the lumber is graded and pulled according to length, width and grade.

Lumber moves down gradual incline and under railroad tracks. Belt has now traveled 1,378 ft. Lumber then hits two rolls and moves onto the 620 ft green lumber conveying chain.

Case 9—Mississippi

Handling Acid Safely

A SOUTHERN equipment manufacturer uses the illustrated system for transporting and storing carboys of cleaning acid. An Elwell-Parker Electric Co. power truck and operator do the work safer and faster than could be otherwise accomplished.

Six carboys of sulphuric acid are assembled on a wood skidboard in a freight car and the unit load weighing 1200 lb is carried by the electric fork truck to storage area, to be moved later into the factory as required for cleaning metal parts and tubing.

Here as elsewhere a good foundation such as a wide concrete pavement between buildings facilitates yard storage thus making these outdoor areas more useful. Many materials, including acids, oils and chemicals, can be stored outside close at hand yet out of the way of production work within the plant. Ease and speed with which heavy loads may be transported is making outside storage areas more valuable.

In assembling a stack in storage a load is first put down on the pavement; then a bare skid-board is placed on top of the boxes to protect the necks of the bottles. Another load is then placed on the top board. Stacks are generally two-high.

Case 10—Louisiana

Handling Simplified

IN a transformer manufacturing plant a Hyster "20" Lift Truck has proven to be the only satisfactory way of handling materials on an existing 17½ per cent incline and has shown a labor saving of 40 cents a ton in handling.

Operation

Materials are moved from the first to second floors over an 87 ft long ramp with a 17½ per cent grade. First method tried was hydraulic hand trucks. When this proved unsuitable, a light panel truck was used. Third method was an electric winch which towed the hand trucks up the ramp by means of a cable. The Hyster lift truck accomplished the job satisfactorily.

Production savings are noted in time saved per trip from first to second floors, reduction in men needed, tonnage per man-hour and decreased labor cost per ton.

In addition, the Hyster truck is used to unload and load transport trucks from the floor level, since there are no loading docks.

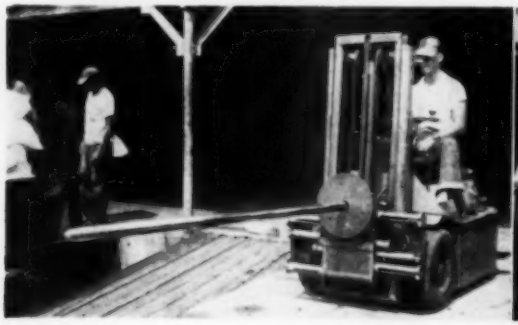
Case 11—Georgia

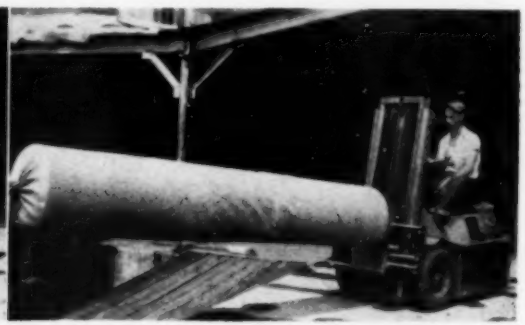
Lift Truck Handles Sheeting Rolls

PACOLET Mills, New Holland, Georgia, load rolls of sheeting 108-in. long and weighing approximately 400 lb with a Hyster-20 lift truck equipped with a quick attachable ram. Ram is inserted in the core on which the sheeting is rolled.

In this way the roll is picked up, transported and stacked in the trailer by one man. Procedure results in a saving of 9 man-hours on every trailer of sheeting loaded.

It takes only 2 or 3 minutes to remove a Load-Grab attachment from this Hyster-20 lift truck and install this special 6 ft ram device for handling sheeting rolls. Attachment was made in Pacolet Mill's maintenance shop. Four Hyster-20 lift trucks are utilized in Pacolet's New Holland and Gainsville, Georgia operations. Photos courtesy Wrenn Brothers, Hyster distributor in Atlanta, Georgia.





Case 12—Florida

Conveyor For Hot Materials

THE Coronet Phosphate Company, Plant City, Fla., purchased through Republic Rubber Division's distributor, The Mine and Mill Supply Company, Lakeland, Fla., a Republic Super Excelo Hot Material Belt.

The service life obtained from this belt was 13 years, which "outlasted" the first three belts of a competitive make on a 2-to-1 basis. The material conveyed was hot phosphate rock on an incline conveyor to the storage bins.

Republic Rubber's belt carried over three times as much hot tonnage in its 13-year life as any previous belt.

Case 13—Georgia

Clay Pipe Handling

BY introducing a fleet of Kwik-Mix flatbed Moto-Bugs for internal product handling, Oconee Clay Products Company, a Milledgeville, Georgia clay pipe manufacturer, realized substantial reductions in time and labor.

The Moto-Bugs, equipped with elongated flatbed bodies, handle loads averaging one-half ton. Length of haul varied from 100 ft to something over 1000 ft.

Actually, the Moto-Bugs perform two operations for this manufacturer: they haul clay pipe 6 to 15 in. in diameter and handle flue lining ranging from 8x8 to 24x24-in. Loads being carried now are almost three times larger than what could be handled in the old operation with hand push carts.

Modernizing this portion of the operation has increased production in kiln setting time about 1/3 and decreased labor by approximately two men.

A similar saving in labor and increase in production was experienced in adapting the Moto-Bugs for hauling pipe from the kiln into freight cars or trucks.

Moto-Bugs, shown in operation at the Oconee Clay Products Company at Milledgeville, Georgia, are manufactured by the Kwik-Mix Company, subsidiary of the Koehring Company.

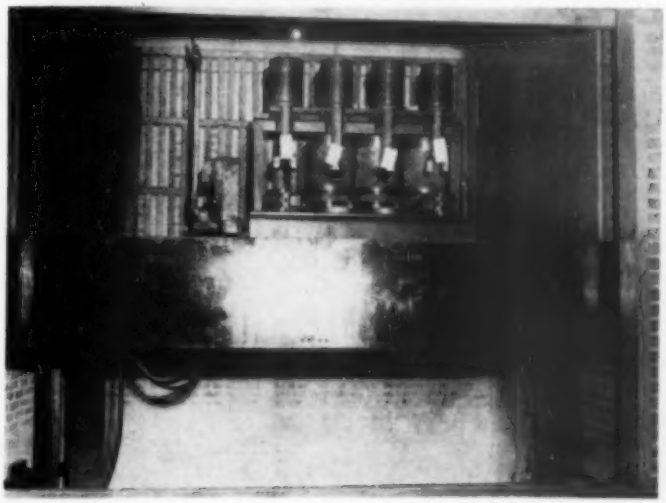
Case 14—Missouri

Heavy Duty Elevator

IN planning the new diesel locomotive repair shop at Springfield, Missouri, the St. Louis and San Francisco Railway wanted to be able to store heavy diesel parts on the second floor, above the locomotive repair bays.

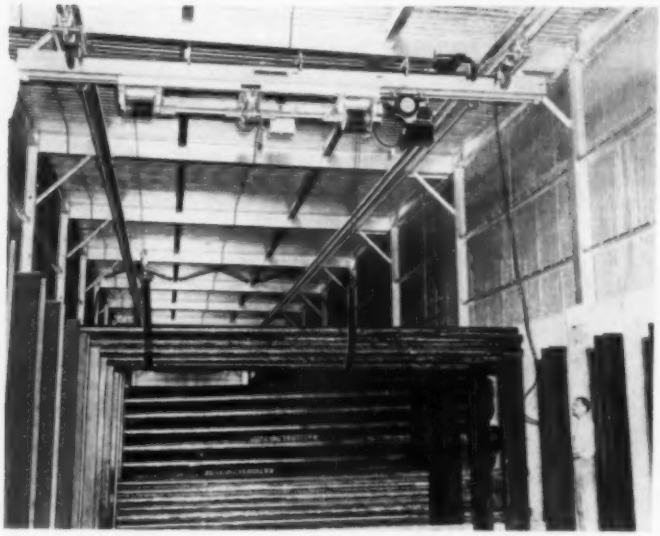
Between the ground level and the second floor of the shop, the railroad installed a heavy-duty Otis freight elevator capable of carrying locomotive parts weighing as much as 10,000 lb. The elevator has automatic controls of the modern "collective control" type, so that it can be operated "self service" by the regular employees of the locomotive shop.

Otis elevator installation permits storing heavy parts above repair bays in this new Diesel maintenance shop.



Case 15—Virginia Warehouse

Save $30 on Every Car Unloaded



EVERY time a carload of pipe averaging 60,000 lb is unloaded in their Roanoke, Virginia, warehouse, The Noland Company, Inc., realize a saving of thirty dollars.

Loads are picked up with flat woven wire slings on a twin-hook hoist. By push-button control the crane operator raises the load to the upper limit of the hoist. He then dispatches the 2-ton American MonoTractor crane to any one of the thirteen stations along the 246 ft runway, where it contacts a retractable limit switch and stops.

Operator on the warehouse floor takes over control of the crane, places the pipe in the proper rack, unhooks one side of each sling and pulls the slings through the pipe by raising the hoist hooks. The crane is then dispatched back to the car for another load.

American MonoRail installation at The Noland Company warehouse in Roanoke, Virginia.

Case 16—Carolina Woodworking

Crane Modernization at Timber Treating Plant

TAYLOR-COLQUITT COMPANY operate timber treating plants in Spartanburg, South Carolina and Wilmington, North Carolina. Eight 25 ton American DiesElectric locomotive cranes took over the heavy handling jobs for the plant from 13 outdated steam cranes. The speed and safety of the eight cranes allowed elimination of one of the three shifts formerly required to handle the work.

One of eight 25 ton American Hoist & Derrick Company's Diesel - electric cranes used at the North and South Carolina plants of Taylor-Colquitt.

Railroad cross ties are vapor dried, which cuts down on checking and splitting. Ties are being vapor dried and treated in a matter of hours instead of months as required for the former method of air seasoning prior to treatment. Some 600,000 ties are handled each year.

The pole yard, where the heaviest Spartanburg jobs are handled, was the site of the development of one of the first and most successful pole peeling machines. Pole is rotated by a series of rollers and knots, rough spots and inner bark are neatly removed and leveled, resulting in a high quality pole. Other machines, like a slab-gainer and a multiple drill, together with the pole peeler, have speeded production ten times over the usual methods in use 20 years ago.

For more detail on these plant case histories (equipment or evaluation of results) write Southern Power & Industry, 806 Peachtree St., N.E., Atlanta 5, Georgia.

Section 2

Instruments and Controls

Temperature control feature of tunnel kiln modernization . . steam traps provide even temperatures in textile slasher . . regulating valve affords constant pressure and supply . . field test set for checking transformers . . instead of clutch, starter regulates motor driving pulpwood conveyor

Case 17—West Virginia Insulator Manufacturer

Tunnel Kiln Modernization

BETTER firing using less fuel followed kiln modernization at Porcelain Products, Inc., Parkersburg, West Virginia, fabricators of high tension line insulators.

As modernized, Porcelain Products' 360 ft Allied tunnel kiln is divided into five zones: initial, pedler, main preheat, firing, and cooling. Fired by natural gas, the kiln has a capacity of 18 cars per 24 hours. Ware is fired on open setting supported by silicon carbide plates.

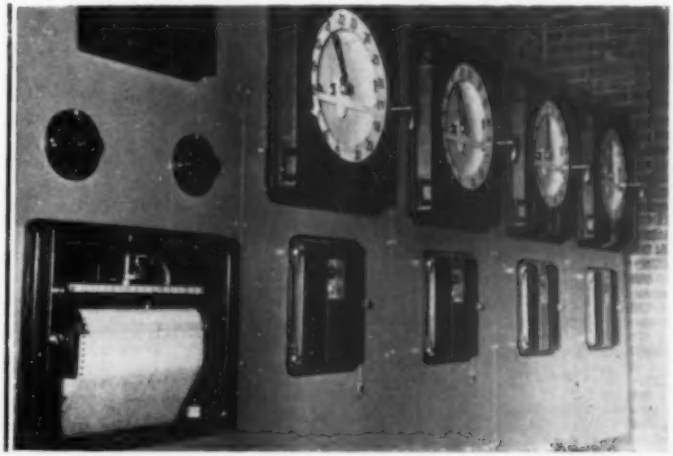
Kiln Gradient

Ware moving through the 87 ft initial zone is gradually heated by recirculation to 1800 F. In the 50 ft pedler zone, temperature rises to about 1900 F, climbing to 2100 F in the 30 ft main preheat zone. A total of 24 burners, 12 on each side of the kiln, are distributed throughout these zones.

From the main preheat zone, ware moves into the main firing zone, where it is heated by a total of 34 more burners. Complete vitrification takes place in this 60 ft section at 2400 F. The final cooling zone, about 112 ft long, permits ware to fall to 50 F—at which temperature it is properly conditioned for exposure to atmosphere.

Kiln instrumentation follows the conventional pattern. That is, the high-temperature main firing zone is under automatic control, while pre-heat zones are regulated by hand. Automatic regulation is obtained through four high-speed Leeds & Northrup Speedomax electronic controllers—two per each half of the firing zone. Four platinum thermocouples are spotted at

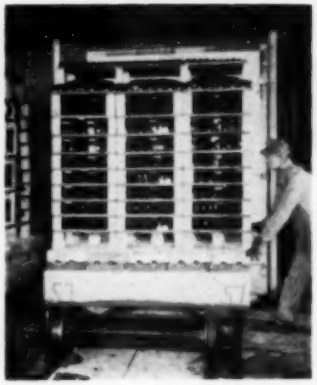
Control panel for Porcelain Products' new kiln. Four Speedomax controllers and P.A.T. control units immediately below them, employ side-to-side principle, based on temperature at kiln sides rather than at crown.



the sides of the firing zone to give effective, accurate *side-to-side* control.

Using manual regulation on the burners in the pedler and preheat zones takes advantage of the fact that the kiln has a certain *base load* of heat which will always be required during operation. Burners in these two zones are set by hand to meet the base load and normally are not throttled up or down thereafter. Temperatures in the initial, pedler, and pre-heat zones are checked periodically with a Leeds & Northrup manual temperature indicator — spot-checked occasionally with an L&N Optical Pyrometer.

All instruments in the plant are centralized on one convenient control panel. The ceramic engineer and operators rely upon these instruments to give them an accurate record of what is going on in the kiln at all times. In addition, the Speedomax recorder charts form a permanent production record.



Porcelain Products, Inc., West Virginia insulator manufacturers, depend on Speedomax temperature control to give them uniformly fired high quality ware.

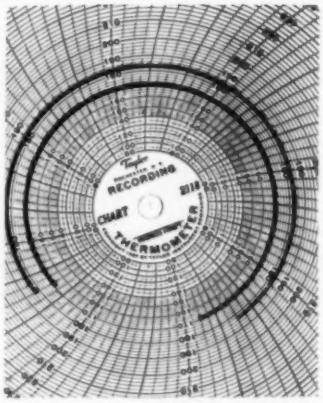
Case 18—North Carolina Textile Mill

Even Temperatures With Steam Traps

IN most textile mills great difficulty is experienced in trying to keep the slasher cylinders at a constant temperature without variation. This is especially true in rayon mills where the fiber tissues will be damaged if the temperature is raised too high and at the same time it must be high enough to do a satisfactory job.

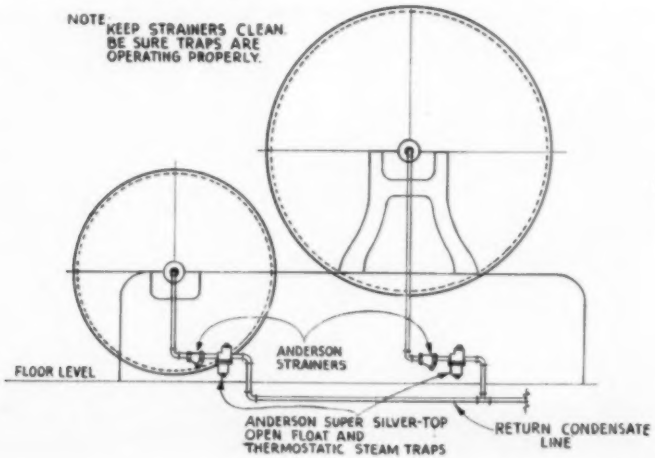
Eliminate Air

The main problem in trying to maintain even temperatures is that of air elimination. Air is injected into the steam-heated cylinders to reduce the temperatures and then it must be removed rapidly in order to make room for more steam. The slashers are also stopped from time to time to repair the warp and the steam is shut off automatically and vented at the same time. This permits air to be drawn into the cylinders as the steam condenses resulting in a large quantity to be handled when the slasher is again started up.



Portion of a temperature recording chart shows the even temperatures attained after installation of the V. D. Anderson combination traps. Chart shows temperatures of two cylinders on one slasher during a 24 hour period. One cylinder held a constant temperature of 180 F; the other a temperature of 170 F.

Typical arrangement for trapping two cylinder slasher. Strainers are placed in front of the traps to keep the traps as clean as possible to assure continued satisfactory performance


NOTE KEEP STRAINERS CLEAN. BE SURE TRAPS ARE OPERATING PROPERLY.
FLOOR LEVEL
ANDERSON STRAINERS
ANDERSON SUPER SILVER-TOP OPEN FLOAT AND THERMOSTATIC STEAM TRAPS
RETURN CONDENSATE LINE

Trap Design

In order to overcome this problem, one progressive Southern textile mill replaced their old traps and by-passes with combination openfloat and thermostatic Super-Silvertop Steam Traps, made by The V. D. Anderson Company of Cleveland, Ohio. These traps have an inverted bucket and handle the steam condensate in the usual manner but in addition, the thermostatic element in the top can handle large quantities of air before the steam reaches the trap. This function is automatically controlled by the temperature difference between the air and steam.

Case 19—Florida Food Processing

Regulating Valve Improves Dryer Operation

PASCO PACKING CO., citrus canners, concentrators, and by-products manufacturers of Dade City, Florida, have increased the production of their citrus feed driers by installing a 6-in. Leslie type D-1 pressure valve to maintain a steady steam supply to the driers at a minimum of 43 pressure.

Constant Pressure

Operating in conjunction with a non-condensing turbine generator of 1000 kw capacity, the Leslie pressure controller maintains a constant minimum pressure on the process steam line. Prior to the installation of this valve, the process steam line pressure depended upon manual operation of a by-pass valve or rapid increasing or decreasing of load on the generator.

The installation of additional feed driers has increased process steam demand until the turbo generator could not supply all that was required. The Leslie type D-1 was installed and the pilot was set to maintain a minimum of 43 psig on the process steam line. At times when the requirement for process steam exceeds that supplied by the turbo-generator, the Leslie valve takes over. When the turbine can supply the demand the Leslie valve cuts out and all process steam is supplied by the turbine exhaust.

This arrangement has assured a constant minimum pressure and a constant supply with resulting increased efficiency and cheaper operation.

Pasco uses other Leslie controllers for maintaining constant steam pressure and supply to the hot lime-soda ash stage of their two-stage water softener, for maintaining a constant boiler feedwater pressure on the feedwater header and for reducing steam pressure from 45 to 15 psig for heating of offices and laboratories.—*A. Lohkamp, Supt. Power Plant, Pasco Packing Co., Dade City, Fla.*

Case 20—N. Carolina

Transformer Turn Ratio Test Set

IT is a routine practice of Duke Power Company to ratio power transformers when they are being conditioned for service.

Recently a bank of power transformers being moved to a new location were given a routine check with the Biddle TTR Test Set. The test indicated a fault in one of these transformers. Investigation revealed several shorted turns on the primary. Since the fused turns were not grounded the transformer has operated for some time without failure but with an unbalanced voltage and circulating current in the delta. Having discovered this fault with the TTR Test Set it was possible to repair the transformer without excessive cost or interruption of customer service.

The Biddle Transformer Turn Ratio Test Set is simple to use in the field and insures quick, easy, highly accurate readings. Operated by one man, it is completely self-contained, including 8-volt hand generator, test leads and clamps.

Case 21—Alabama Paper Mill

Starter Replaces Clutch

START-STOP! Start-Stop! Seven million arcs made and snuffed out. Yet the Westinghouse Life Linestarter continues to operate in absolute trouble free fashion to the complete satisfaction of the Gulf States Paper Corporation, of Tuscaloosa, Alabama.

Starter was placed in operation by Gulf States on January 15, 1950, to control the motor driving a conveyor delivering pulpwood logs to a giant chipper. To properly regulate the flow of pulpwood, the motor has been started and stopped, in lieu of a clutch, an average of ten times a minute, twenty hours a day, seven days a week, for nine months. A total of more than 7,000,000 arcs have been drawn and extinguished. Yet no contacts have been replaced, and no noticeable deterioration of the originals has been observed.

For the first six months of operation a 20 hp squirrel cage motor, 3/60/440 volt, with a starting current of 150 amp, was installed. When the duty proved too severe for the motor, a wound rotor motor, 15 hp, with fixed resistance replaced it. But the same Life-Linestarter continued to function perfectly through its thousands of cycles, week after week.

Close-up of one section of the Gulf States Control Center installation. The Westinghouse Life Linestarter controls a 10 hp wound rotor motor which drives conveyor to a giant chipper. In lieu of a clutch, starter is used to regulate the flow of wood and is started and stopped an average of 10 times a minute, 20 hours a day, seven days a week.

Section 3

Power and Steam Generation

Unique combustion control system . . fuel savings with new burner . . oil in boiler condensate . . deionizing feedwater . . burning wood refuse . . flexible framing for conduit . . carryover problem . . sidepull coal conveyor . . scale and corrosion control device . . stokers

Charlie Taggart, chief engineer of Falstaff Plant No. 5 takes data from the Hays CO_2 recorder.

Case 22—Missouri Brewery

Boiler Plant Improvements at Falstaff

Wide load swings handled easily, CO_2 up from 6 to 12 per cent, fuel bills reduced and boiler efficiency 82 per cent in St. Louis plant modernization.

WHEN Falstaff purchased their present Plant No. 5 in St. Louis from a small independent brewery, they realized that the plant had to be completely modernized to meet rigid production standards. Boiler room equipment was too small and inefficient to meet current and future requirements.

The company had three B&W 7500 lb/hr boilers. Two were natural draft chain grate stoker fired and the third was gas fired. Boiler room wall was extended for a new B&W integral furnace, 150 psi steam generating unit. It is fired by a forced draft, chain grate stoker using strip mine coal.

Boiler is equipped with a special drum designed for brewery loads —giving a capacity of 48,000 lb/hr. Because of the high load swings which characterize operations (12,000 to 28,000 lb/hr swings) the effective grate area was increased to 10 x 11 ft.

New boiler carries the entire

Operator inspects power unit controlling outlet damper. Note CO_2 analyzer at extreme left.

This material has been adapted from an article authored by *Charles H. Bergmann*, superintendent of engineering, Falstaff Brewing Corp., St. Louis, Missouri and published in a recent bulletin of The Hays Corporation.

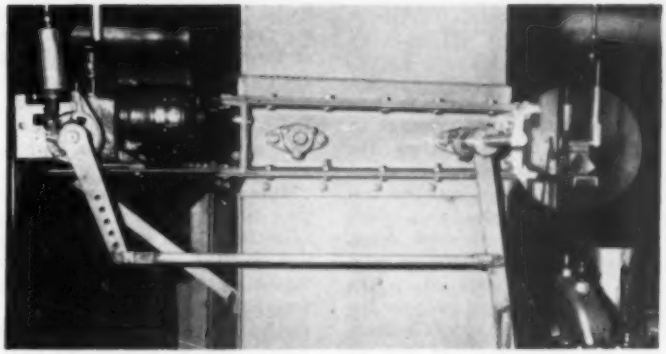
load, both heating and process. Three older boilers are used for stand-by.

Combustion Control System

The new boiler has automatic controllers and the Hays combustion control system. Latter is located to the right of the boiler. The all electric system consists of four controllers for the control of steam pressure, air flow, fuel feed, and furnace draft and four power units to operate the forced draft inlet damper, forced draft fan turbine valve, stoker reeves drive lever and the boiler outlet damper.

The Hays master controller is connected to the steam header at the point where the steam pressure is to be maintained relatively constant. The controller, in turn, adjusts the Hays air flow controller for the required rate of air flow through the boiler. The air flow controller measures the draft loss across the boiler by controlling the volume of air from the forced draft fan.

A fuel feed ratio controller, operating in conjunction with a tachometer blower (driven by the variable speed shaft of the stoker drive) measures the drop in draft across the boiler and controls the rate of stoker speed as represented by the suction of the tachometer blower, to maintain the fuel feed in proportion to the air flow.



Unique Control of Forced Draft

Special feature of Hays control system in the Falstaff St. Louis plant is the cascading relay controls (1) opening of forced draft damper through power unit at left and (2) fan turbine speed, through power unit (inset).

The forced draft fan is turbine driven and is also provided with a damper at the outlet of the fan. For maximum efficiency and range of load both fan speed and damper are controlled automatically by cascading their operation.

This method of operation controls the forced draft fan turbine speed for regulating the volume of air for combustion when the load is quite substantial. The damper at the fan during these load conditions is wide open. As the load decreases the fan speed is automatically decreased until the safe minimum speed is reached, at which point control of the forced draft air is automatically transferred from fan speed control to the operation of the damper. With a further decrease in load this damper is closed automatically as much as may be required to control the volume of air required for combustion.

With an increase in load damper is opened automatically as required until it reaches the wide open position. At this point control is automatically transferred to the turbine valve and control of volume of air is obtained by regulating the speed of the turbine driving the fan.

The Hays furnace draft controller is connected to the furnace and maintains a constant prede-

New B&W boiler and Hays control panel. Note power unit at extreme left controlling fuel feed.

termined draft in the combustion chamber by operation of the boiler outlet damper.

Stoker Speed Control

To prevent possible damage to the Reeves drive operating the stoker an interlocking electrical relay is incorporated in the control circuit with a power unit which operates the Reeves drive lever. The coil of this relay must be energized by power supplied to the stoker drive motor in order for the relay contact in the circuit between the fuel feed controller and its power unit at the stoker drive to close, allowing operation to take place either manually or automatically. The Reeves drive lever cannot be moved electrically unless the stoker drive motor is energized.

Manual Control

Each controller is provided with a manual control station equipped with a hand-automatic selector switch. Manual control switches are provided to *open* or *close* each of the several power units. There are two manual control stations in connection with the air flow controller—one for the damper power unit and one for the fan turbine valve power unit.

These manual control stations provide for maximum flexibility in operation. Thus it is possible, by means of the control station at the master control, to remove the boiler from automatic steam pressure regulation and to operate the entire boiler manually, even though all of the functions (air, fuel, etc.) remain automatic. In addition each controller may be operated either automatically or manually on the panel, as desired.

To maintain maximum efficiency regardless of fuel quality the fuel feed controller is provided with a means of manually changing the ratio of fuel to air.

Steam produced by the boiler is used for Bottle shop requirements, brewing operations, stand by electric generation, heating and refrigeration. In the winter heating claims approximately 6,000 lb/hr of steam and process functions require 8,000 to 10,000 lb/hr. Bottle shop requirements are approximately 6,000 lb/hr and refrigeration from 6,000 to 7,000 lb/hr.

Results

Falstaff engineers point to definite benefits resulting from the use of Hays combustion control. Wide load swings have been efficiently accommodated by the control. Furthermore, average CO_2 figures have increased from 6 per cent to 11 per cent to 12 per cent and the fuel bill has decreased by several hundred dollars per month. Stack temperatures which were formerly 750 F are now 650 to 700 F. Boiler is operating at 82 per cent efficiency and maintenance expense bill has been cut 65 per cent.

Case 23—Georgia Mining Operation

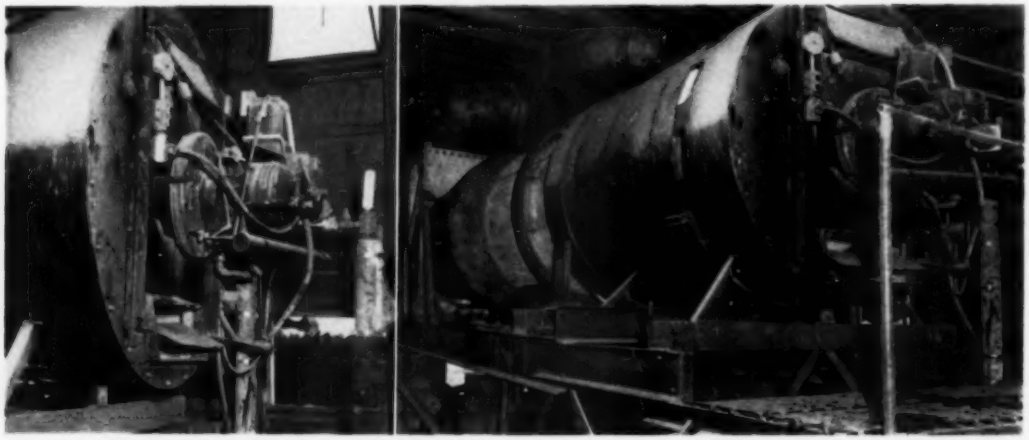
Fuel Savings Pay for Burner Installation in Three Months

DAWES Silica Mining Company at Thomasville, Georgia, employs large oil-fired rotary dryers in connection with extensive sand processing operations.

For some years, the manager of this plant had recognized the economy advantages of using heavy oil for fuel, but because of the direct association of combustion gases with the sand in the rotary dryers trouble from oil contamination of the sand was always experienced when attempting to burn heavy fuel oils.

While the owners were not optimistic with regard to results, they gave permission to install Ray Oil Burner Company equipment on a trial basis, at no expense to Dawes in case performance proved unsatisfactory.

Ray Oil Burner Company equipment installed by the Industrial Equipment Company of Orlando, Florida, at the Dawes Silica Mining Company, Thomasville, Georgia.



D. L. McDuffie and C. L. Malone of Industrial Equipment Company, Orlando, Florida, arranged for D. W. Strickland to take the necessary materials and equipment from the main plant in Orlando, Florida, and install it in accord with carefully worked out plans for the special requirements of the Dawes plant. All of the work was handled on a rush basis in order to minimize interruption to sand processing.

The crew had worked continuously for 24 hours, pausing only for meals and coffee. Fatigue had taken its toll, but all work was completed only one hour later than scheduled. With some feeling of relief, the "baking-out" period was started.

Following the bake-out period the dryer was placed in operation. But production was found to be only half of the former capacity, and the forward end of the dryer was overheating. "Had we spent all our time and money trying to do the impossible?"

Malone wanted to try a totally different air combination and Strickland figured out a refractory change which seemed to have possibilities—both as last resorts.

These changes were quickly made after a short rest period. Meanwhile production was continued at reduced capacity. Then another test run was started.

It was found that production then exceeded the original maximum rate, and the processed sand was clean and free of contamination.

Appreciable Savings

After carefully checking the oil consumption of the Ray Oil Burner against production, figures indicate that fuel savings alone paid for the entire installation, including one day's lost production, in less than three months. This saving is in addition to entirely eliminating operation of a twenty-five horsepower electrically-driven air compressor. Operation has also proven that the close heat control triples the life of the expensive belts which carry away the hot sand.

The last time Mr. Malone visited the plant, a noticeable amount of smoke was seen and brought to the attention of the manager. "Oh, that," he exclaimed, "we have a customer using our sand for a certain type of casting mold. He uses oil in the sand for this work, and formerly he mixed it all into the sand himself. We discovered that we now have such close control, we can put an oil coating on during drying. The customer, of course, pays us a little premium for this extra service."

Case 24—Alabama Milling Company

Power for Pellet Production

A GROWING Southern industry is the mixing and pelleting of animal feedstuffs for the convenience of handling, rationing and waste elimination. In recent years there has been a definite trend toward modernization in the milling industry with the introduction of the latest developments in equipment and methods.

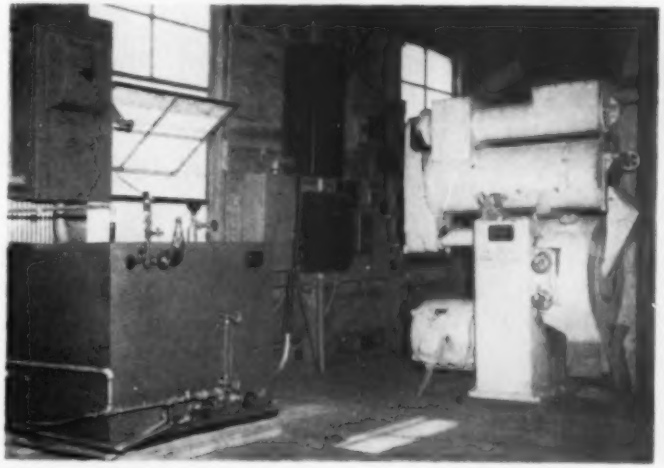
In the manufacture of feed pelles, premixed feedstuffs are spouted from bins into the pelleting machines where the various ingredients are further mixed with steam and ground to the proper consistency. The mixture is then extruded through dies. The friction of the milling and extruding operation creates heat which in effect bakes the pellet mix so that it leaves the extruder in a rod like form which is cut into pellets by revolving knives in the various sizes for cattle, hog or poultry feeding. Steam is an essential element, serving as a lubricant, moistener and to diffuse the heat evenly.

Steam Generation

The Brundidge Milling Company of Brundidge, Alabama, in connection with an expansion and modernization program, installed, early in 1950, a Speedylectric Boiler manufactured by the Livingstone Engineering Company of Worcester, Massachusetts. The decision to use electrically generated steam was influenced by the need to eliminate fire hazards in dust filled atmospheres and to insure a continuous supply of steam available at any time through the simple process of throwing a switch. That this Speedylectric Boiler installation has proven completely successful is evidenced by the fact that the Brundidge Milling Company, in a further expansion program in 1951, installed a second and larger Speedylectric.

Among the advantages reported by this milling company are low-

A Speedylectric boiler of the Livingstone Engineering Company generates steam for this Alabama milling company.



ered insurance rates due to elimination of fire hazards, a constant source of steam at instantly adjustable pressures for various types of pellets, the elimination of rejects due to the consistent quality of the steam generated in a boiler adjacent to the pellet mill, the elimination of long pipe lines and fuel storage tanks and trouble-free installation at negligible maintenance expense.

Case 25—Southwest

Oil Removed From Boiler Condensate

A Southwestern chemical plant was troubled with excessive amounts of oil in an emulsified state in the condensate reaching their boiler. There was a dire need for a filter to clarify the condensate which contained this emulsified oil. Plant engineers placed a diatomaceous earth type Refiner Filter on the line.

The Refiner is a pressure leaf type filter for clarifying or polishing manufactured by The Blackburn-Smith Mfg. Co., Inc., of Hoboken, N. J.

The results of the effluent after the filtration proved that there was less than 1 part per million of emulsified oil in the condensate. This filtration of condensate was accomplished at 210 F. The condensate now reaching the boilers is clear and free of oils and eliminates their costly maintenance, cleaning and retubing of boilers which took place prior to the installation of the filter.

Case 26—Oklahoma Waterworks

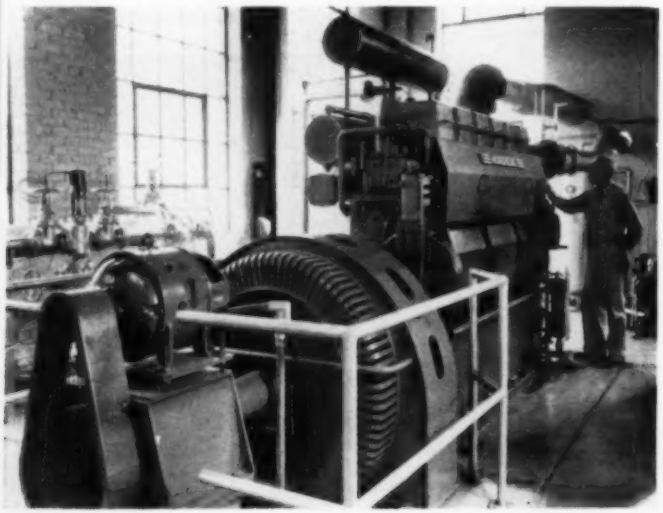
Water Department Cuts Fuel Cost 44 Per Cent

THE Shawnee, Oklahoma, water department has reduced the cost of fuel for generating a kilowatt-hour more than 44 per cent through installation of a new Nordberg Duafuel engine. At the pumping station it takes about one kwh to pump 1,000 gal of water. The new engine, burning natural gas with a small quantity of pilot oil, generates a kwh for an average fuel cost of 3.8 mills. This economy was achieved at an average load factor of only 42 per cent. On test, with the engine carrying an 88 per cent load, fuel consumed amounted to a scant 2.2 mills per kwh.

Shawnee, a city of 25,000 population, has provided itself with an abundant water supply and a good handling system, utilizing gravity wherever possible to move the water. The big reservoir is Shawnee Lake created in 1935 by the erection of a 50 ft high earth dam on South Deer Creek. This provided a lake with a total capacity of 7.4 billion gallons.

The water makes the 5.5 mile trip to the station by gravity where it flows to two settling basins, two sedimentation basins and a clear well, giving the plant a storage capacity of 4,500,000 gal. After the clear well, it takes power to move the water. Three motor-driven centrifugal pumps do the work: One rated at 1350 gpm at 200 ft head, one rated at 1800 gpm at 200 ft head and one rated at 2200 gpm. There is also a 2400 gpm pump for standby service.

Chief engineer, *L. A. Parman* of the Shawnee, Oklahoma water department, checks gauge readings. The new 375 hp Nordberg Duafuel engine drives directly a 250 kw Electric Machinery generator with 5 kw V-belted exciter.



New Unit

Until 1950, power was supplied by a 200 hp Diesel, capable of running any one of the big pumps. But in recent years, fuel oil has been expensive and the growing city often has required the operation of two pumps. To assure adequate power, the city put into operation in April, 1950, a 375 hp Nordberg Type FS-96-SC Duafuel engine. The Nordberg supercharged unit has six cylinders of 9-in. bore and 11½-in. stroke and develops its rated horsepower at 600 rpm. It drives directly a 250 kw Electric Machinery generator with 5 kw V-belted exciter.

Utility Saves by Deionizing Feedwater

THE Waukegan plant of the Public Service Company of Illinois is claimed to be the first central station to install a complete deionizing system for treating make-up feedwater for high-pressure boilers. The evaporators it replaced were already in operation on the three boiler turbine units most recently installed. In addition, the deionizing plant will condition all make-up water for an 1800 psi unit scheduled to start operation late this year. Savings of 74 per cent in the cost of treating are claimed.

Two three-stage systems for silica-removing deionization have flow rate capacities of 120,000 pounds per hour each, although this rate is rarely utilized because the two sets normally operate in parallel. These units, which take advantage of the high-capacity Amberlite exchangers recently developed by Rohm & Haas Co., will condition make-up water for six boilers operating at 350 psi, for 10 operating at 650 psi, and for the proposed 830,000 pound per hour cyclone-fired reheat boiler which will operate at 1800 psi.

Analysis of the raw water showed about 156 ppm (as $CaCO_3$) in total ionized solids; total hardness of 130 ppm (as $CaCO_3$) and a silica concentration of 5 ppm (as SiO_2). Although the system was installed only after thorough preliminary engineering studies, it was checked, soon after the shakedown run was concluded, to establish complete data on hardness, silica content, total ionized solids, pH values and other factors.

Treated water was found to average 3 ppm in total ionized solids, giving an electrical resistance of approximately 200,000 ohms/cm, to have zero hardness and a silica concentration of about 0.2 ppm. Total cost of deionization was running about $0.12 per 1000 gallons of water treated —including the estimated cost of resin amortization as well as that of chemicals required for regeneration. Thus, the estimated overall cost for 5,000,000 gallons—a year's make-up water—is $6000 for deionization, as contrasted with $23,000 for evaporation, a saving of $17,000 or 73.9 per cent.

Installational Data

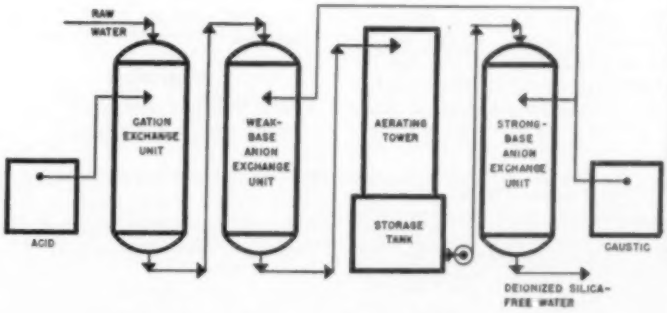
The installation includes a duplicate set of cation, anion, and silica-removing elements, with one aerating tower for removing carbon dioxide. The cation exchange units have diameters of 8′ 0″ and straight-shell heights of 6′ 0″; the weak-base anion exchange units measure 6′ 6″ by 6′ 6″, and the strong-base anion units 6′ 6″ by 7′ 6″. After salts have been converted to their respective acids in the cation units, the strong acids are removed as the water passes through weak-base anion exchange resins, with Amberlite IR-4B carrying most of the burden. Silica and the remaining traces of carbon dioxide are removed in the final unit by the strong-base anion exchange resin, Amberlite IRA-400, whose development by Rohm & Haas Company in mid-1948 made silica removal by ion exchange a practical reality.

The cation exchange material in this installation uses two charges, each of 125 cu ft. Each weak-base anion unit contains 100 cu ft of resin, and each strong-base anion unit (for silica adsorption) contains 85 cu ft.

About 3.26 lb of 66 degrees Be. H_2SO_4 per 1000 gallons of water treated are required for regeneration of a cation exchange unit. Each strong base anion exchange unit requires 0.40 lb of caustic for the same quantity of water treated. This caustic is recovered and utilized for regeneration of the weak base anion exchanger, thus appreciably reducing operating costs.

Between regenerations, each cation exchange unit is able to condition 92,000 gallons of water; each weak base unit, 480,000 gallons; and each strong base unit, 750,000 gallons.

The cost of deionizing treatment is much lower than that of evaporation, particularly in view of heat losses suffered through evaporator blowdown and degradation of heat in the evaporator to a lower pressure. Maintenance savings are realized because corrosion of piping and equipment is held to a minimum as carbon dioxide, never totally removed from water after evaporation, is completely removed by deionization.



Plan of Silica-Removing Deionizing Installation

Operation of this power plant is demonstrating four major advantages of three-stage silica-removing deionization over evaporation: an assured, adequate supply fo conditioned water, low first cost of equipment, low operating costs and low maintenance costs.

Deionization is producing a water of consistently high quality despite a wide variation in the quantity required — a variance intolerable in the normal operation of evaporators.

Initial cost of deionization equipment was estimated at approximately 60 per cent of that of evaporators of equivalent capacity. Ion exchange units require much less space than do evaporators, though some of this advantage might be forfeited where raw water requires pre-treatment before reaching the ion exchange unit.

Case 28—Southeast Copper Refinery

Boiler Water Level Troubles

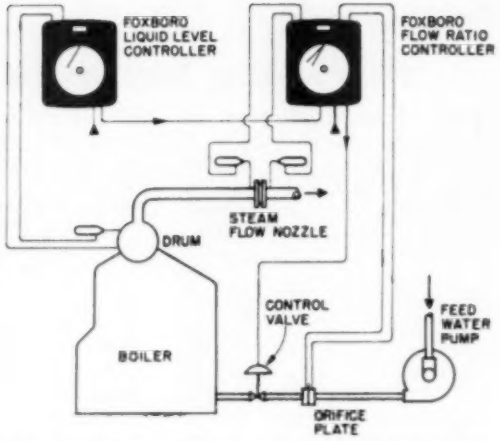
BOILER water level difficulties at a Southwestern copper refinery, due to violent surges of steam consumption and fuel supply, have been eliminated in one of the four boilers by the installation of a Foxboro S-W-L Control System. Similar controls are now being contemplated for the remaining boilers.

Operating Problem

The control problem in this plant is complicated by the fact that the boilers are supplied with waste heat, which is sharply increased when the heat source, the refining furnace, is charged with logs to burn off excess gases from the molten metal.

Because of this uneven firing, and also the sudden changes in steam demand, such intensive cycling in drum level resulted in the boilers, that before installation of the steam-water-level control system "the high and low level alarm whistles sounded continuously." Now, only three whistles are heard, instead of four.

The S-W-L Control System is shown diagrammatically in the accompanying sketch. A Foxboro Flow Ratio Controller maintains a definite ratio of boiler feed to steam output so that for each pound of steam used, a pound of feedwater is added. A Foxboro Liquid Level Controller acts to correct this ratio setting automatically if the proper drum level is not maintained. However, false level indications caused by boiler swell during sudden load changes are ignored. Only true increases or decreases actuate the control system.



Foxboro S-W-L Control System as installed in a Southwestern copper refinery. Air supply to instruments — 17 psi.

Case 29—Georgia Woodworking

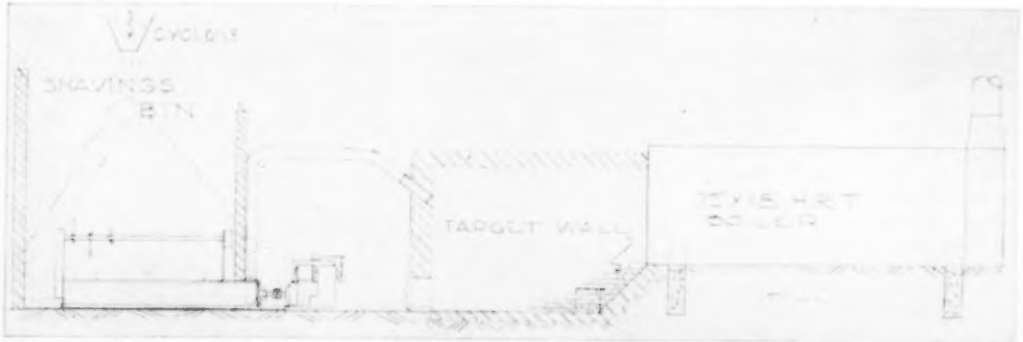
Less Smoke, More Steam from Wood Refuse

ROYAL Manufacturing Company, located in the heart of the Southern hardwood region at Newnan, Georgia, is one of the largest plants in the country devoted exclusively to the manufacture of wooden toilet seats. Their product has had wide acceptance and distribution in every state in the union and in many foreign countries.

Operation

This company uses a 150 horsepower HRT boiler to provide the necessary steam for two Moore cross circulation dry kilns, two kilns for curing glue joints, and the heating rooms for baking enamel. Until recently, this boiler was being hand-fired with shavings, sawdust, and large blocks—refuse from their manufacturing operations. They employed three firemen 120 hours on straight time, and 48 hours at time and half weekly. But even with this amount of help

Operational sketch of Pyre-Pneumatic Wood Shavings burner as installed at the Royal Manufacturing Company, Newnan, Georgia.



steam pressure was very erratic and they were unable to hold better than 50 pounds pressure during peak load conditions. One of the most serious problems, however, was the fire hazard, not only in the boiler room but from the emission of sparks from the stack. In addition to this, smoke was very heavy and black at certain times, and caused difficulty with their neighbors and the city officials.

Equipment

This firm elected to install a Pyro-Pneumatic Wood Shavings Burner manufactured by the Industrial Furnace Construction Company, Inc., of Birmingham, Alabama, and represented by the Applied Engineering Company in Georgia, South Carolina, and North Carolina.

This firing unit feeds shavings directly from the bin (as shown in sketch) into the furnace without manual attention. Fuel is blown into the furnace at high velocity through a 6-in. conveying pipe and enters the furnace suspended in the air stream and broken up into scattered particles which readily burn in suspension.

A checkered, beehive type target wall is provided for the particles to converge on. Radiant heat from this target wall aids suspension burning and also provides many small shelves upon which the heavier particles which did not burn in suspension may repose and burn. A very clean fire without the expected "pile" is maintained and the fuel is burned on a hearth without grates or forced draft fans.

Secondary air for combustion enters through the front and side fire box doors by natural draft while the air from the high pressure conveying pipe creates turbulence within the fire box as well as providing primary air for combustion.

A modulating feed device varies the amount of fuel blown into the furnace with the steam load requirements of the plant. If the load is satisfied even on lowest feed and steam pressure continues to rise, the unit automatically shuts off until pressure drops to a predetermined re-start setting.

Feedwater

Prior to the installation of this unit, water returned to the boiler was controlled manually, but a feedwater return system was installed which now gives completely automatic control of water without manual attention from operating personnel. The unit is equipped with an automatic combustion control that modulates very evenly in relation to the steam demand.

Savings

The installation has resulted in numerous improvements to operation. They have saved three full-time firemen, and estimate that a maintenance man is required for only two hours of each 24-hour day for blowing down the boiler and miscellaneous attention. In addition to savings in labor, they are burning approximately 1/3 less fuel for the same steam load; and this allows them to sell all of the refuse blocks to the ready market in Newnan. In addition, they have eliminated smoke and sparks to the satisfaction of the City of Newnan and their neighbors, and have reduced the fire hazard to a minimum.

For more detail on these case histories write SP&I, 806 Peachtree St., N.E., Atlanta 5, Ga.

Case 30—Florida Mine

Boosting Boiler Efficiency

ABOUT a year ago while I was visiting a Florida phosphate mine, the plant superintendent mentioned that, because of an overloaded boiler, they were not able to maintain their production schedule.

Investigation indicated that proper combustion was not being obtained. Sabanol Fuel Oil Homogenizer was recommended to eliminate sludge and water from the oil, keep strainers and burners clean as well as to afford better combustion. Sabanol Fuel Oil Homogenizer is a product of the American Sand-Banum Co. Better performance was readily apparent.

As the boiler had accumulated considerable scale in spite of the treatment used, Sand-Banum Anti-Boiler Scale Treatment was adopted, leading to a perfectly clean boiler in a few weeks.—H. K. Wilson, St. Petersburg, Fla.

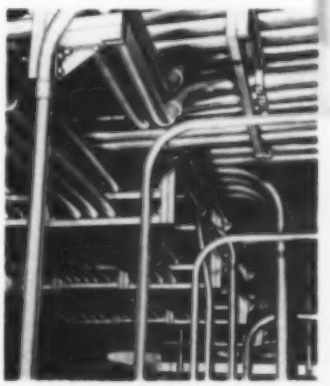
Case 31—N. Carolina

Flexible Framing Supports Conduit

ALL-PURPOSE metal framing supports heavy rows of conduit in the recently completed Dan River Steam Plant of the Duke Power Company. In this installation the company's own personnel utilized the built-in Unistrut flexibility and strength to erect "on-the-job" framing where supporting members were added to the basic structure as the work progressed.

Unistrut permitted the conduit runs to be installed closer together, conserved space, provided neat appearance and structural excellence while eliminating entirely the need for drilling, welding, or special tools. Engineering detailing time was reduced to a minimum, as well.

Framing as utilized in the Dan River steam plant of the Duke Power Company is manufactured by the Unistrut Products Company of Chicago.



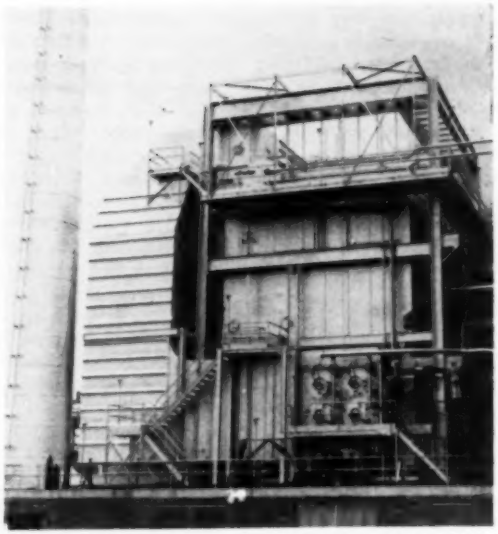
Case 32—Oklahoma

Boilers "Suspended in Air"

CONSIDERABLE dollar savings by elimination of foundation footings, plus relief from the problems of expansion and contraction of boiler side walls, are tangible assets of installing boilers "suspended in air."

The new Babcock and Wilcox water wall boiler that was placed in operation recently for the Public Service Company, Weleetka Power Station, Weleetka, Oklahoma, is a good example of this type of installation. This gas, oil, or coal fired boiler is designed for a maximum steam output of 330,000 lb/hr with a steam pressure of 700 lb and a steam temperature of 835 F.

To increase efficiency, all major heating elements of the boiler are insulated. The boiler front wall is insulated with 2 in. thick Hy-Temp block, and the furnace front wall is insulated with 4 in. thick Hy-Temp block. The insulation on both walls is covered with a metal casing bolted to the boiler proper. The flue duct is covered with 2½ in. thick Magnesia block and weatherproofed with Armstrong Cork Company's Insulmastic.



Shown in this view of the new "suspended" boiler at the Public Service Company, Weleetka Power Station, Weleetka, Oklahoma, are the boiler and furnace front walls and the flue duct from boiler to the air heater.

Case 33—Texas

Not Oil Contamination But Carryover Problem

MAKE-UP water for the boilers at the Shell Oil Company's natural gasoline plant at Dillard, Texas, has a total hardness of about 20 ppm and an alkalinity of 300 ppm. Such brackish waters are quite common in the Southwest.

When the local engineer from the Power Chemicals Division of E. F. Drew & Co., Inc., New York City, called at this plant, the only problem reported was one of oil in the gage glass of the boilers and the statement that an unusually large amount of oil was required for the engines.

Detailed Survey

A survey of the plant was made and water samples collected and analyzed. It was immediately evident that all of the conditions were present which would lead to very bad carryover from the boiler; that is, the solids concentrations in the boilers were far in excess of the amount that could be tolerated and the presence of oil, of course, aggravated the situation. It soon became apparent however that the oil need not be considered the cause of the carryover but probably was coincidental; that is, the carryover had caused interference in the lubrication of the engine requiring the use of considerably more oil than would normally be necessary. Oil was thought to be the real problem according to plant personnel.

Solution

After analyzing the data, the Drew engineer concluded that carryover undoubtedly was the chief difficulty and was really responsible for the oil problem. It was pointed out that evidence of carryover was the fact that the steam meters showed uneven operation.

It was recommended that Drew Organic U14L containing an antifoam be fed to the boiler at such a rate that approximately 200 ppm would be present in the boiler water. This was started and even with the high concentration of total solids in the boiler water, it was soon noted that the steam meter operation was smoother. Also, lubrication of the engine soon improved and as a result less oil was used and the oil in the gage glasses in the boilers disappeared. At the present time good overall results are being obtained.

This example indicates how difficult it is to ascertain the exact problem that is present in the plant operation. For example, it was thought that the problem was one of oil contamination, whereas investigation showed that the carryover problem was really due to too high solids concentration.

Rather than blow the boilers excessively to remove the high solids concentration, an antifoam was used which permitted operating at the highest solids concentration with a minimum amount of carryover.

Case 34—Virginia

Forced Draft Required

THE Richmond Linen Service of Richmond, Va., utilizes a B & W 500 hp, Type H, Sterling boiler fired by two oil burners with No. 6 oil.

To secure the necessary forced draft, the plant engineer installed a Size 19A-EMD-5 J. L. Wing motorized blower with Voltrol Vanes, 220/440 v, 3 phase, 60 cycle current, 1750 rpm, 5 hp motor. Voltrol Vanes coupled with a Cash standard Type 95 Air-Flow regulator gave very precise control of air flow and maintained steam pressure and combustion efficiency within very close limits.

Case 35—S. Carolina

Crusher Operates Over Rated Capacity

AN American AC-7-C coal crusher is reducing ROM 12-in. to 1-in. at a large South Carolina power plant at a capacity of 550 tons per hour. This is 10 per cent over the rated capacity of 500 tons per hour. Equipment is manufactured by the American Pulverizer Co., St. Louis, Mo.

This excellent output is being accomplished with a motor load not in excess of 230 amp, which is 90 per cent of the load rating of the motor.

Case 36—Southwest

Boiler Protection

APPROXIMATELY a year ago a large Southern refinery was encountering severe scaling conditions in their 100 hp boilers due to very hard creek water being used for feedwater makeup. Boilers were being operated on a twenty-four hour basis.

Plant engineers decided to install Beco-Cells on the boilers. The Beco-Cell is a scale, rust, corrosion control device manufactured by the Brown Electro Company of Oklahoma City, Oklahoma. Thorough inspection some five months later found only a sloppy silt deposit in the mud-rim. The boilers were nearly perfectly clean.

The corrosion control device consists of highly active elements, which when placed in heated water will generate a slight current of negative energy sufficient to neutralize and render inactive, both chemically and electrically, the foreign particles that cause corrosion, pitting and rust. The same action slowly dissolves old scale.

The only wearing part of the device is the inner core which slowly disintegrates with the functioning of the device and can be easily replaced.

Case 37—Kentucky Tobacco Plant

Sidepull Conveyor Moves Coal

WHEN it became apparent that an insufficient number of bunker discharge openings were causing segregation and excessive amounts of coal were remaining in dead storage, engineers of The American Tobacco Company's Louisville, Kentucky, plant decided on a sidepull Redler conveyor to solve the problem.

Since the Redler is self-feeding and is capable of recirculating material, eleven gated openings were spaced along the bunker. Coal is fed direct to the Redler, which in turn discharges to scales which weigh and then feed stoker hoppers.

Dead storage is now reduced to a minimum and segregation is not a problem, since coal is discharged at short intervals along the entire bunker. The dust-tight feature of the Redler is also an important aid in keeping up plant cleanliness.

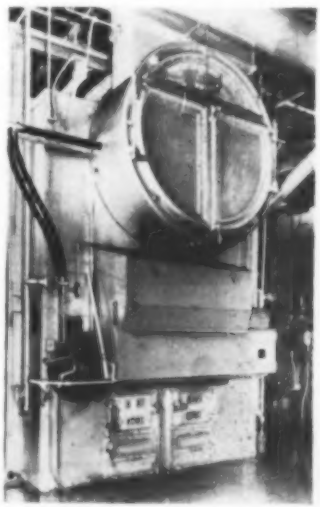
Stephens-Adamson Mfg. Company's Redler conveyor as installed at The American Tobacco Co., Inc., Louisville, Ky.

Case 38—N. C. Textile

Boiler Room Efficiency

THE Chadbourn Hosiery Mills at Charlotte, N. C., is distinguished for its high standard of operation and maintenance. Top notch operation includes the bright clean boiler room and low steam costs.

Key to this fuel burning efficiency is the FYR-FEEDER stokers manufactured by the American Coal Burner Company of Chicago, which serve two 183 hp boilers. The units are 4-burner models with 35 sq ft of grate surface.



One of the two boilers at the Chadbourn Hosiery Mills at Charlotte, N. C. Note boiler room cleanliness.

Section 4—Refrigeration and Air Conditioning

Electrostatic precipitators . . minimizing explosive hazard in chemical plant . . air conditioning for product quality . . automatic roof cooling . . collecting fibers and plastic dust . . refrigeration requirements for frozen citrus industry . . humidity and temperature control

Case 39—North Carolina Textile Mill

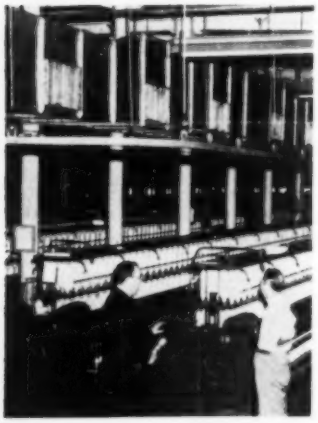
Electric Air Filtering

COMPANY management had electrostatic precipitators installed in the spinning and drying rooms to increase overall product quality affected by general airborne soil, specifically accentuated by a local industrial smoke condition.

Trion Electric Air Filtering Equipment was selected with a combined air handling capacity of 60,600 cfm (equivalent to the amount necessary to filter air in 38 average six room homes.) After installation, there was immediate evidence of increased product quality, decrease in labor costs and machinery maintenance.

Trion operates on the principle of electrostatic precipitation. It is effective against all air-borne particulate matter—dust, dirt, smoke, pollen, and other air contaminants, including those of sub-microscopic size. The Gastonia equipment is designed for an overall efficiency of 90 per cent.

A bank of ionizing and collecting cells serves the spinning rooms. As incoming air is directed into the cells, all particles pass through a high voltage ionizing screen where they are electrically charged posi-



GASTONIA Combed Yarn Corporation, parent company of Irene Mills at Taylorsville, N. C., Jewel Cotton Mills at Thomasville, N. C., and Gurney Manufacturing Company at Prattville, Alabama, operating 105,178 spindles, was organized in 1936.

Plant modernization programs began during 1945 and recently neared completion with the overall modernization of the Clara Mill at Gastonia, North Carolina. Over a million dollars was spent in renovating the original building built early in the nineteen hundreds and for new equipment installed prior to resumption of operations in September, 1950.

Spinning room of Gastonia's modern Clara Mill showing overhead ductwork and outlets. "Trionized" air, provided by Trion Electric Air Filter equipment, has had all dirt, dust, lint, soot, etc. removed. *James Potter*, Trion engineering representative from Charlotte, North Carolina, is talking with *J. J. Hinds*, general superintendent of the Clara plant.

For more detail on these case histories write SP&I, 806 Peachtree St., N.E., Atlanta 5, Ga.

tively. The air then passes between negatively charged plates to which the particles adhere, and the resultant pure air exits to the spinning room, leaving behind the smoke and dirt which previously had to be hand-or-mechanically-cleaned from the room and equipment.

Minimum Maintenance

The collected dirt on the Trion collecting plates is removed by a wash system which is an integral part of the Trion unit. By simply turning an outside valve, the entire filter, including ionizers, collecting cells and insulators, is thoroughly washed, and the dirt flushed into the plant sewer system. High-pressure, solid cone, jet nozzles require a minimum of water. At Gastonia, the Trion cells are washed twice a week, with the entire washing cycle taking 45 minutes. The actual washing requires only twenty minutes. During the remaining 25 minutes, the plates are drying, and the wash operator is free to perform other duties. On the air-inlet side, Gastonia's Trion unit is fitted with a mechanical screen for the removal of lint which might otherwise foul the filters.

The lint is periodically removed by brushing down the screen—an operation requiring 5 minutes, which can be accomplished while the filters are being washed or dried. The clean-air side of the Trion unit is equipped with waterproof mechanical filters which prevent the exit of dirt blow-off which might occur under unusual conditions, or when the cells are allowed to become over-dirty.

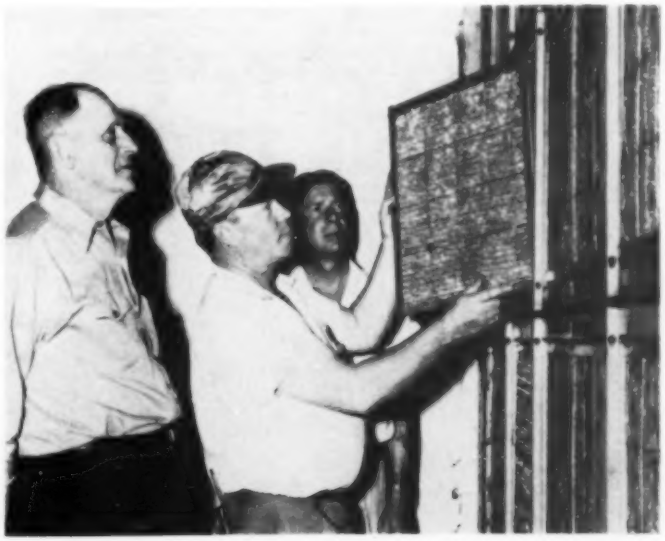
Other Economies

Besides the short time and the small volume of water required for routine maintenance, Trion provides other operating economies. The Trion system uses no more electric current than would be required by a few electric light bulbs. It utilizes ordinary 110 volt a-c which is stepped up to high voltage d-c current by power packs supplied with the Trion system. Trion power packs are especially designed to indicate the exact operating condition of the entire filter installation, and are equipped to fully protect against short circuits and the adverse influence of possible temperature fluctuations. Power pack parts are chassis-mounted for quick removal and replacement, if necessary, to reduce possible shut-down time to an absolute minimum.

As a direct result of installing Trion filters in its spinning room at Clara Mill, Gastonia reports a considerable savings, realized through higher production efficiency, operating economy, and greatly reduced maintenance costs. This saving is a secondary result of Gastonia's Trion installation. Primary purpose of Trion air cleaning was to increase product quality.

These three power packs step up ordinary 110 v a-c to high voltage d-c current. Red indicator light tells instantly if the equipment is operating. Milliameter gives operating current readings and is a quick check in the efficiency of the equipment. An "on-off" switch instantly starts or stops operation of the entire equipment.

J. A. Wilcox, master mechanic; *J. W. Helms*, chief electrician (holding filter); and *E. D. Horton*, superintendent, inspect after filter on clean air side of the Trion Electric Air Filtering equipment. Filters are "built-up" in banks and include ionizing-collecting section, collector plates and after filter. Power packs are adjacent to this equipment.

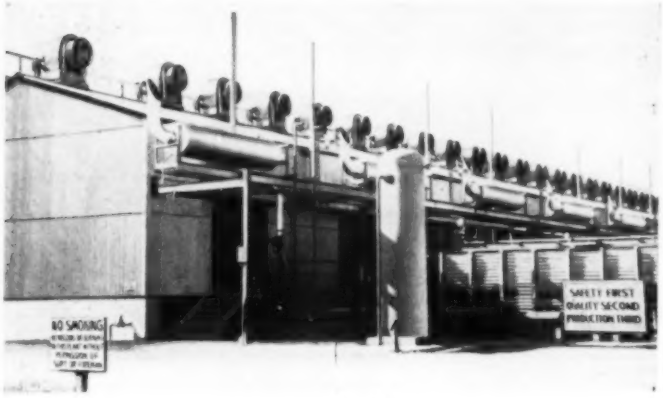


Case 40—Texas Chemical Plant

Large Exhaust System Handles Explosive Hazard

AT Dow Chemical Company's huge Freeport, Texas, operation, plant engineers had the job of providing sufficient ventilation to prevent formation of explosive mixtures in an ammonia plant compressor room. The compressors handle a mixture of nitrogen and hydrogen at high pressure. The explosive limits of hydrogen are wide.

Several of the twenty-eight 36-in. Sturtevant exhaust fans installed on the roof of Dow Chemical Company's ammonia plant compressor room at Freeport, Texas.



Engineers had to provide two air changes a minute in the compressor room with an absolute minimum of one change per minute in inclement weather. They also had to space fans close enough together so that there would be no possibility of formation of hydrogen pockets in peak of the roof between fans. The fans would also have to discharge against a relatively high wind so that the wind would not block them off.

Equipment

Twenty-eight, 36-in. Sturtevant elbow axial flow fans, delivering 470,000 cfm at ⅛-in. SP at 1,150 rpm were installed on 10 ft centers. They have a capacity of approximately 50 per cent when bucking a 40 mph wind and will not be completely blanked off until the wind reaches 60 mph.

No explosive mixtures have formed to date and none are expected, and Dow operating personnel have an exceptionally well ventilated building which gives pleasant operating conditions.

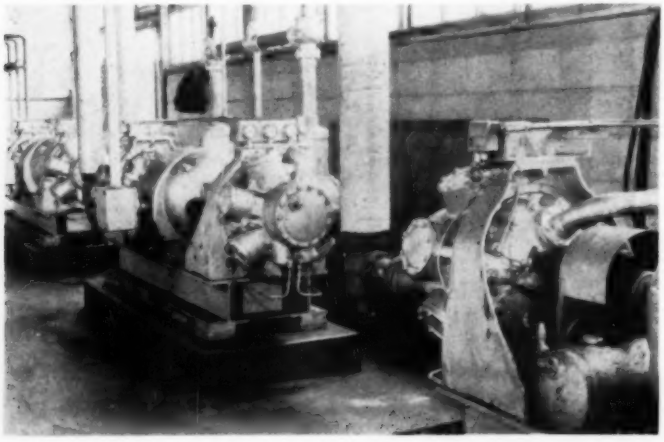
Case 41—Tennessee Manufacturer

Refrigerator Manufacturer Air Conditions

A TENNESSEE manufacturer of hermetic condensing units for refrigerators and deep-freeze boxes increased production and improved quality of product through use of air conditioning.

Air conditioning was needed to enable the manufacturer to produce hermetic condensing units with close tolerances free of moisture, dirt and rust; to eliminate variances (holding sizes) in gauges used in testing equipment; and to improve employee comfort.

Three Chrysler Airtemp 75 hp radial compressor units keep grinding and assembly rooms of this Tennessee manufacturer at the right temperature and humidity.



Equipment

Three Chrysler Airtemp 75 hp radial compressor units, centrally located, maintain proper temperature and humidity in the grinding and assembly rooms.

Two Chrysler Airtemp 5 ton "Packaged" air conditioners placed in the motor storage room eliminate moisture and prevent rust forming on motors and stators.

One Chrysler Airtemp 5 ton "Packaged" air conditioner is used in the instrument room where temperature and humidity must be kept constant at a predetermined point. This room is used in sizing all gauges used in testing equipment. This room also houses a jig bore used in making items requiring very close tolerances (.0005-in.).

Two Chrysler Airtemp 5 ton condensing units cool water which in

turn eliminates moisture in hydrogen gas used in the brazing furnace.

One Chrysler Airtemp 30 ton radial compressor, centrally located, supplies conditioned air to the general offices for employee comfort.

Results

Production increased to approximately 1800 units daily; quality of the product was improved; and better working conditions existed, resulting in higher employee morale, greater employee efficiency and lower employee turnover.

Case 42—Georgia Manufacturer

Automatic Roof Spraying Cools Plant

AIR conditioning equipment, which a few years ago cost approximately $300 per ton has now soared to over $600 per ton. This is of concern to both management and air conditioning engineers.

This increase became important to the Lily Tulip Cup Corporation in 1947 while their new plant in Augusta, Georgia, was under construction. Management requested their air conditioning engineers to find a way of lowering the estimated tonnage requirement in order that the necessary air conditioning system could be purchased within the alloted budget.

The sprayed roof—automatically operated by thermostat bulbs attached to the upper surface of the roof—was suggested as the answer and, after careful study and investigation, engineers found that a surface temperature could be maintained at 8 degrees above wet bulb. This system was recommended and when these findings were applied as design figures for the roof temperature, the revised tonnage requirement was 300 ton instead of the original 400—a reduction of 100 tons.

The April Showers System of roof cooling (roof sprays) was awarded the contract and after three years of operation, the 300-ton air conditioning system plus the April Showers Roof Cooling System, has proved a satisfactory and economical method of eliminating the solar load and maintaining the desired indoor climate conditions.

Operation

The water consumption cost is much less than the cost of electrical hp to accomplish the same amount of cooling. The maintenance of a roof cooling system is chiefly a periodic flushing of the fine orifice sprays. A fine spray is required in order to eliminate water waste and hold an even 3 degrees, plus or minus, roof temperature when set at 8 degrees above wet bulb. The sprays operate when the roof thermostat calls for cooling. The spraying period is often not more than 20 to 30 seconds, while the off period is usually four to five times as long. The April Showers System eliminates 92.5 per cent of the roof load of air conditioning.

Results at the Augusta plant have pleased management of the Lily Tulip Cup Corporation so much that they have purchased a similar system for the 270,000 sq ft roof of another new plant in Springfield, Missouri. It is estimated that the April Showers System will reduce the tonnage requirement at this new plant by as much as 260 tons.

Engineers are specifying very little roof insulation for buildings being erected in the south, when a roof cooling system is contemplated.

Distinctive entrance to the modern Lily Tulip Cup Corporation plant in Augusta, Georgia. A roof spraying system, designed by the April Showers Company, Inc., Washington, D. C., reduced air conditioning tonnage requirement 100 tons.

A roof through which heat passes readily can, when sprayed, be converted into a coolant, or heat absorbing area, into which room heat is dissipated upward because the roof is at all times cooler than the air. Hence, a small amount of insulation is more desirable where a roof cooling system is employed.

April Showers installation on the roof of the Lily Tulip Cup Corporation's Augusta plant is automatically operated by thermostat bulbs on roof. System lengthens life of built-up roof by protecting it against prematurely drying out from exposure to solar heat. The volatile oils in water-proofing materials will not boil out and evaporate when the roof temperature is held below 90 F. A new device known as the Apsco Hydro-Electric Operator and now available with such systems, conserves water and prevents run-off.

Case 43—Missouri Manufacturer

Process Operations Freed From Dust

AN interesting equipment arrangement is being used at Gustin-Bacon Co., Kansas City, Mo., for collecting mixtures of fibers and plastic dust that are given off from manufacturing operations at that plant. Company manufactures insulating materials for refrigerators and cars, and it is in the mat-forming process that the troublesome dust is created.

Specially-equipped cloth-tube-type dust collectors manufactured by American Wheelabrator & Equipment Corp., of Mishawaka, Indiana, trap the troublesome particles for re-use and separate the plastic dust from the fibers. The special mechanisms which separate the fibers from the dust-laden air are condensers, also manufactured by the American Wheelabrator & Equipment Corp.

Condenser Operation

The condenser consists of a rotating perforated drum, equipped with air seals at the top and the bottom. As the air flows through the perforations from the outside of the drum to the center, the fibers are deposited on the surface of the drum while the plastic dust passes through and on to the cloth-tube collector where it is trapped. The collected fibers are automatically cleaned off of the rotating drum and reclaimed.

Operation of the condenser is governed by a device which measures the pressure drop across the mat of fibers and the drum itself. This device regulates the mat thickness so that it does not offer too much resistance to air flow, but still is thick enough so that the mat does not disintegrate when taken off the drum.

The plastic dust which is trapped in the cloth tubes is periodically removed by a mechanical shaking of the tubes. The dust falls down into the hopper of the collector from where it is reclaimed and taken back to manufacturing operations for re-use.

Condensers are only used on those units ventilating mixtures of fibers and dust.

Case 44—Florida Citrus Industry

Conversion to Frozen Concentrate

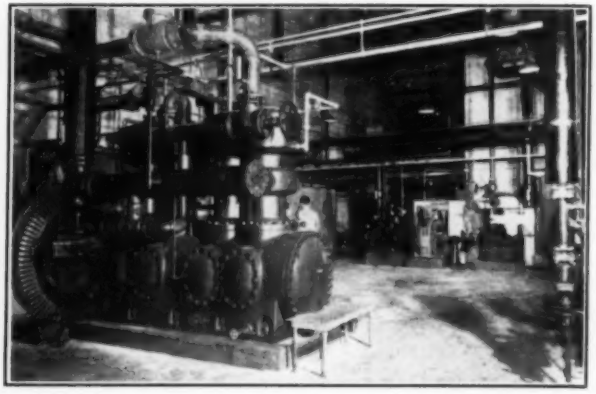
THE Florence Citrus Products Cooperative in 1948 was making a high quality single-strength orange juice at its plant in Florence Villa, Florida. The price of this natural juice was declining rapidly, while the cost of cans, cartons and freight was rising.

The members of the cooperative arranged with Mojonnier Brothers of Chicago to convert the plant for making frozen concentrated citrus juices. Using the original building, elevators, bins, extractors, fillers and conveyors, Mojonnier installed their Lo-Temp evaporator system with such promptness that the redesigned plant was running in less than 90 days.

Between March 1 and June 15 of last year, the plant processed 500,000 boxes of fruit. The 4-to-1 concentrate was sold in advance at a better margin of profit than could have been made with the single-strength juice. The saving on cans and cartons during the 3½-month period amounted to $260,000. Seven carloads of fruit, when reduced to the concentrate, are shipped for the cost of one car of whole oranges.

Refrigeration is as much the heart of this concentrating process as it is of most air conditioning systems. The low-pressure steam coming from the evaporators is condensed with direct-expansion ammonia, and the heat thus recovered is pumped back to the evaporators with the hot discharge gas from the compressors, in a closed cycle which is very efficient.

The product after being blended is held at 25 deg in a cold-wall tank with a capacity of 600 gallons. From this vacuum tank the juice enters the votators, where it is cooled to about 18 degrees and is slush-frozen. In this condition the concentrate is put into the sterilized 6-oz cans.



Seven Frick Company compressors supply the refrigeration requirements of the plant. The largest has four cylinders of 14-in. and 12-in. stroke, and is driven by a motor of 700 hp. This big machine carries the heat-pump load on the evaporators and condensing cycle. It works at a suction pressure averaging 70 lb and a discharge of 225 lb gauge.

Two sets of booster machines, each with its second-stage compressor, are connected to the conveyor and holding freezers. A duplexed 11½ by 8 and 7 by 7 operate on the conveyor tunnel, while an 8¾ by 6 and a 6 by 6 carry the storage. A 5 by 5 handles the cold-wall tanks and a 6 by 6 the votators.

Case 45—Maryland

Air Conditioned Cork

TWENTY years ago the Crown Cork and Seal Company of Baltimore, Maryland, had to close up shop when the weather wasn't right. Crown makes the cork closures that fit inside bottle caps, and this calls for the handling and processing of finely ground cork. If the weather was too hot or humid, these small cork particles stuck together and were difficult to work with. Unfavorable weather could slow or stop production at any number of points in the process.

Controlled Conditions

Air conditioning was still an infant when Crown Company officials saw it as an answer to fickle weather—a way to control conditions so production need never bog. They had a system of fans and heating and cooling coils installed to control temperatures and humidities all along the production line. And it paid off—the controlled conditions stopped the hot-weather slow-downs, and production and the company both flourished.

But that was 20 years ago. One war and the threat of another with accompanying stepped-up production demands had just about worked the old air conditioning equipment past the point of efficiency. What they needed was a completely new installation, an installation that could do a bigger, more efficient job.

Process

The new equipment would have to supply cool, dehumidified air—at just the right conditions—to keep the ground-up cork from sticking together. And this same air that kept the cork easy to handle would have to blow the particles along the process line.

Eventually the air conditioned cork—carried by the conditioned air—moves to storage bins. Here, too, temperature and humidity are carefully controlled to condition the cork for the next stage in the bottle cap-making process. From the storage bins, the cork goes to molding machines, entering as granules and coming out in long rods. After these rods are baked, they are sliced like sausage to make the discs that form the key part of a bottle cap.

All along the way—from the granulated raw cork to the finished closure—closely regulated temperatures and humidities allow Crown production to speed around the clock, regardless of outside weather. The air conditioning system that provides these just-right conditions consists of four Trane Spray Coil Dehumidifying Units and five Trane Centrifugal Fans. This system has proved itself—production-wise—to Crown, controlling temperatures and humidities throughout the process and moving the cork through its first stages.

Lloyd E. Mitchell and Company, Inc., Baltimore, was the mechanical contractor for the air conditioning installation.

At the Crown Cork and Seal Company in Baltimore, Maryland, granulated cork feeds through hoppers into molding machines in a cool, dehumidified atmosphere. System consists of Trane dehumidifying units and centrifugal fans. Fans and coils are housed on factory roof.

Case 46—Florida Hotel

Cool Air

MANY hotels throughout the South are equipped with Schwitzer-Cummins Fresh Air Makers. An outstanding example is The Hillsboro in Tampa, Florida, with over fifty 42-in. Fresh Air Makers placed in vertical rows in the windows around the big building to serve all its sides and all its room floors.

The hotel management was able to give comfort and relief by an arrangement that cost infinitely less than complete air conditioning.

Section 5

Maintenance Procedures

Radiant heat eliminates floor condensation . . lubrication methods . . industrial floors . . eliminating fire hazards . . transformer finish for Southern climate . . self-sticking safety signs . . powder cutting techniques . . sawing concrete . . coating protects against abrasion

Case 46—Louisiana Sugar Refinery

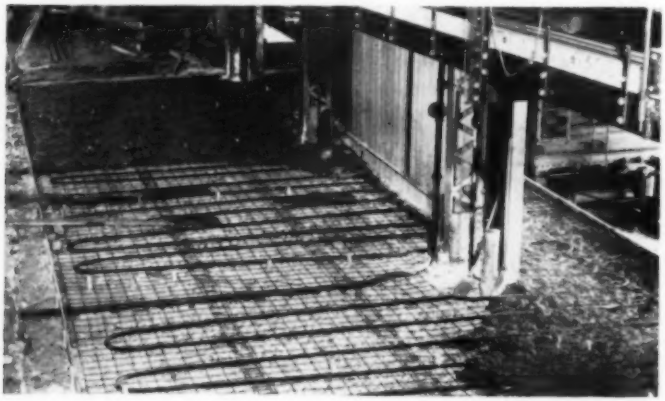
Radiant Heat Eliminates Sweating

A SOUTHERN sugar refiner has solved what was—literally—a sticky problem, through the use of radiant heating.

Officials of this modern cane sugar refinery had been plagued for a long time by the presence of moisture on the floors of their raw sugar warehouses at a deep water port where relative humidities range quite high. These floors consisted of concrete covered with quarter-inch steel plates. Cold-weather "sweating," particularly after a warm humid night, created a hazard because of the inevitable spilling of sugar, the small particles adhering and making the area dangerous to work in.

Engineers decided the job couldn't be tackled by half-hearted measures. They ripped up the old floor, installed radiant heating coils of one-inch wrought iron pipe, and laid a new floor over them. The system was extended also to cover all runways from the wharf to the manufacturing area.

One inch wrought iron pipes carry hot water to keep floor slab at temperature 5 to 8 degrees warmer than outside. System also extends under all runways between the company's wharf and manufacturing areas, as well as the refined sugar shipping department.



No Condensation

The installation, which is regulated to keep the floor slab at a temperature 5 to 8 degrees warmer than that outside, has completely eliminated condensation moisture. Recently the entire refined sugar shipping department got a similar treatment which includes all storage and operational areas as well as shipping platforms.

Case 47—Louisiana

Cooling Hot Barges

HOT BARGE is just another way of saying dynamite. For a *hot barge* is a vessel relieved of its

cargo of oil or gasoline, but still harboring residues capable of generating combustible or toxic gases. How, then, are these hot barges cooled off, made safe for welding, riveting and other repairs—and lay-up time kept to a minimum?

Method

A Louisiana shipyard specializing in barge repair work has developed a set-up for gas-freeing these barges which provides thorough results in a minimum of time. Secret behind the success of gas-freeing operations in this yard is that they have reduced the necessary cleaning work to a mechanical procedure, employing a special Interior Tank Cleaning Unit, available from Oakite Products, Inc., manufacturers of industrial cleaning materials and equipment. Extended into barge tanks, this unit discharges hot detergent solution, at 100 lb pressure, against every square inch of tank surface. Applied in this manner, the detergent knifes through the residues present, cutting them loose from the tank surfaces.

Cleaning Unit

This special interior tank cleaning unit consists of a long tubular shaft, at the bottom of which are two nozzles pointing in opposite directions. At the top of the shaft is an air-driven motor which rotates the nozzles both horizontally and vertically. When revolving, the twin nozzles describe very close mechanically guided spirals to assure complete coverage of all areas with the detergent solution.

The hot detergent solution, delivered under high pressure through the tube shaft to the nozzles, and then sprayed against all areas of the tank, assures a much more thorough cleaning job than can be obtained with just hot water, which lacks the penetrating, wetting-out and emulsifying abilities of the high speed detergent employed.

By utilizing the above mentioned interior tank cleaning unit and special detergent, thoroughly clean and gas-free tanks are rapidly obtained in this yard, with cleaning costs cut, in many instances, 50 per cent or more. Barge repair operations are expedited and lay-up time kept to a minimum.

Case 48—North Carolina Telephone Company

New Floor Surface Improves Safety

A NORTH CAROLINA telephone company, on the recommendation of their plant safety engineers, installed 8000 sq ft of Kentile asphalt tile in the plant battery and generator room—and thereby eliminated a safety hazard and increased operating efficiency.

The flooring in that particular section of the plant had provided a constant operating headache for years. Flooring previously used in the room soon became an occupational hazard for employees, and an expensive maintenance item. Constant wear made it slippery and oil and grease from the machinery created an additional slip hazard for employees. The oil and grease also caused previous floor coverings to deteriorate.

Sulphuric acid from the batteries and hydrometers marred and ate its way through the various materials that were previously tried.

The new floor covering manufactured by Kentile, Inc., increased plant safety, cut down replacement cost, and increased the performance of employees by assuring them a non-slip footing while on the job.

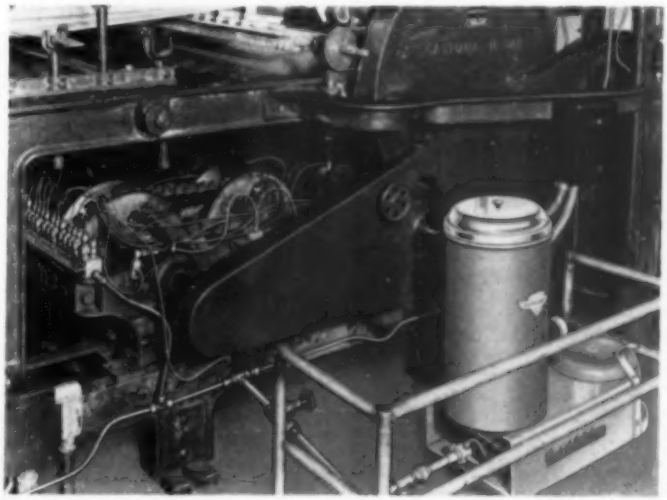
Case 49—South Carolina

Lubrication Time Cut From Hours to Minutes

THE installation of Lincoln centralized lubrication on the slashers in one of the South's leading textile mills has resulted in considerable savings to the mill in both labor and grease costs. Each slasher has over 150 lubricating points, and when lubricated by hand, required considerable time, plus the loss of excess grease.

Lubrication time has been cut from 4½ hours per week to 1½ minutes and the loss of lubricant has been entirely eliminated. Lincoln centralized lubrication applies the right lubricant, in the right quantity at the right time, providing longer service life for the machine without repairs. Savings effected have paid for the cost of the installation many times.

A Lincoln Engineering Company centralized lubrication system as installed in a South Carolina mill.



Case 50—Georgia

Fire Hazard Reduced By Magnetic Means

SEVENTEEN Eriez Alnico Plate Magnets have been installed in a textile operation as protection against fire and textile machinery damage. The company is engaged in the manufacture of cotton felt upholstery and automotive pads.

Each magnetic separator is installed above a spiked apron feeder which feeds cotton linters into garnett machines at the rate of about 350 lb/hr. The non-electric magnets catch any stray iron that may be mixed with the cotton before the metal has a chance to strike the machinery.

The magnetic separators are made by the Eriez Manufacturing Company, Erie, Pa., of Alnico V metal, an alloy of aluminum, nickel, and cobalt. Alnico retains magnetism indefinitely without the use of electricity.

Hundreds of textile plants throughout the world are using Eriez permanent magnetic separators: the plate type over spiked aprons, hump units for pneumatic lines, and pulleys for endless conveyor installations.

By the application of seventeen Eriez magnets, fire hazards have been reduced in this textile mill. Arrow points to the Eriez magnetic separator installed above the spiked apron feeder. Magnet catches any stray iron that is mixed with the cotton before the metal has a chance to strike the machinery and cause a fire.

Case 51—Mississippi

Transformer Finish For Southern Climate

STANDARD transformer finishes have often been found to give insufficient protection from the climatic conditions prevailing through the South. As cleaning and repainting of this equipment is very troublesome and expensive, and as it is often hard to take such equipment out of service, a great deal of thought has been given to this problem.

One utility decided that they would put an additional coat of paint on all new power transformers before putting them into service. They chose "Subalox", a product of Subox, Inc., Hackensack, N. J., for this use as it combines great rust-inhibitive properties with an appearance somewhat similar to aluminum except that it is not as glaring. This system worked very well and was particularly satisfactory in neighborhoods where chemical fumes and vapors were present.

Another utility specified this type of paint on their new transformers. It is hoped in this manner to have no coatings except rust-inhibitive paints applied to the transformer. Two coats are considered ample and will result in a thinner film than is normally the case. This will materially improve the radiation of heat and should prove an additional favorable factor particularly when transformers are overloaded. It is also anticipated that when the time for repainting arrives a great deal less cleaning and scraping will have to be done than has normally been the case and that possibly a single repaint coat may keep the transformer in good condition.

Case 52—Louisiana

Rollers Resharpened

SEVERAL large cane sugar producers in Louisiana were having difficulty in maintaining production during the sugar season due to the feed rollers of the sugar mill becoming dull. This required long periods of shut down to resharpen.

A Cleco vertical grinder with flex wheel resharpens feed roll in this Louisiana sugar mill.

Sugar mills are usually manufactured in units of three rolls or in increments of three rolls to as large a mill as required. Into the circumference of the three rolls in each unit .60° angle grooves are cut the full width of the roll, the pitch of the grooves varying from ⅜ in. to as much as 1½ in. The upper roll or feeder roll has, in addition to the annular grooves, a series of flats ground lengthwise of the roll in such a manner as to form a lip or hook which grabs the sugar cane and pulls it into the mill where it is crushed and the juice extracted. Due to the abrasive nature of the cane, the hook or lip of the feed roll becomes rounded and requires resharpening.

During the grinding season the mills operate on a 24 hour basis, but are shut down for a periodic clean up or "boiling out" process at which time the feed rolls are resharpened. The methods used to resharpen feed rolls required much more time than was required for normal clean up resulting in great loss of production.

New Technique

Various methods were used to resharpen the feed rolls, some producers using chipping hammers, some using horizontal grinders. However, none were fast enough to permit the feed rolls to be resharpened in the normal amount of down time required for a clean out. A new and improved technique has remedied this situation. A Cleco 1480-A Vertical Grinder, manufactured by Cleco Division of Reed

Roller Bit Company, Houston, Tex., equipped with an edge grinding wheel for sharpening the face of the lip or hook and a Cleco 1485 Vertical Grinder equipped with a cup grinding wheel for grinding the wide flat has reduced the time required for resharpening the rolls to less than the normal down time required for clean out, thereby greatly increasing production.

Case 53—Virginia

Multiple Use Safety Signs

SO often getting up safety signs involves so much effort that nothing is accomplished until after an accident occurs.

A safety director in a large farm equipment manufacturing plant uses self-sticking Safety Signs, product of the W. H. Brady Company, Chippewa Falls, Wisc., for both permanent and temporary safety identification.

These signs are made of a self-sticking material and have the safety message printed in large easy-to-read letters. The signs come mounted on handy dispenser cards. All you do to get them up is to peel the sign off the card and apply to any surface such as wood, glass, metal, tile, cement, etc. No screws, lags, bolts, nails or skilled help are required. The signs are very inexpensive and are obtainable in over 250 different stock messages.

W. H. Brady Company's safety signs used to locate fire extinguisher stations and to instruct in the proper use of the extinguisher. They also may be used for barricades, warning signs, safety slogans, etc.

Case 54—Alabama

Powder Cutting For Tough Jobs

CONSTRUCTION and repair can be speeded with powder-cutting in the modern shipyard. Among the many difficult cutting jobs encountered are the cutting of stainless steel door casings for ship boilers, the cutting and beveling of brass bars and bronze plates, the severing of cast iron sections, and

Powder-cutting is demonstrated for the cutting of stainless steel plate at Alabama Dry Dock and Shipbuilding Company, Mobile, Alabama. A regular Oxweld C-32 Oxy-Acetylene Blowpipe, a product of The Linde Air Products Company, is being used. It has been equipped with a special powder-cutting attachment for this work. A small portable powder disperser is in the background.

the cutting of copper pipe into sections. The normal method has been either to attempt the job with a large oxy-acetylene blowpipe, or to use arc cutting, or to send the job to the machine shop.

Method

Powder-cutting is the easy, quick, and economical way to perform these difficult cutting jobs in the shipyard. An iron powder is carried through a tube attached to an oxy-acetylene blowpipe. The ignition of the iron powder provides the extra heat needed to cut through such metals as stainless steel, copper, aluminum, cast iron, and various alloys. The powder-cutting blowpipe will pierce, bevel, and cut most commercial metals, with very nearly the same speed and efficiency that an ordinary oxy-acetylene blowpipe cuts through carbon steel.

Case 55—Kentucky

Concrete Saw Speeds Plant Expansion

THE expansion of General Electric's facilities at Lexington, Kentucky, for the manufacture of electric light bulbs made it necessary to provide for conveyor tunnels and rail chases for bulb making machines.

Installation required cutting to a depth of 3½-in. A Master plate topping was cut first before cutting the concrete.

The Hargett Construction Co. of Lexington accomplished the job with a Clipper Model C-130. A 12-in. Clipper Diamond Blade was used and after cutting about 1200 ft, 30 per cent of the blade life remained.

With Model C-130 of the Clipper Manufacturing Company, rate of cutting speed was about 5 lineal fpm, 3-in. deep through concrete containing river gravel aggregate.

Case 56—Florida

Coating Protects Against Abrasion

IN a Florida installation, where high-grade ore was being separated from a slurry of sea water, a coating was needed to protect the steel spirals from the abrasive action of the sand and mineral slurry. Uncoated metal, spiral surfaces pitted and were considered useless in a period of two to three weeks after being placed in service. The maintenance costs in keeping these

spiral members in operation, were considered far out of line on comparison to the service rendered. It was suggested that a coating be supplied that would allow the spirals to be used for a period of at least six months without any maintenance.

It was desired that this coating be applicable by spray methods and require no high temperature baking methods for the cure. It was also desired that the coating be resilient, resistant to the brine solutions, and resistant to the abrasion and cavitation erosion of the slurry.

Application

The spiral member surfaces were ground smooth, free of all rust spots, and then sandblasted. Atlas Neobon Primer, a Neoprene type adhesive, was applied within one hour after sandblasting to prevent the forming of rust spots. Holes more than ¼ in. in diameter were filled with Neobon Trowel Cement, a high solids Neoprene type compound, to form a smooth and regular surface. Atlas Neobon Finisher, a Neoprene based compound, was then sprayed on the surfaces as a 15-coat membrane. The Atlas products mentioned are produced by The Atlas Mineral Products Company of Mertztown, Penna.

The Atlas Neobon Finisher was sprayed in a two-color system, black and yellow, to insure 100 per cent coverage on each succeeding coat. The fourth coat of Neobon Finisher was applied as a Red Finisher. When this red coat became visible at one of the subsequent bimonthly inspection periods, it was determined that the spiral member should be recoated with an additional eleven coats.

Each spiral member, after receiving 15 coats, was allowed to cure for ten days at room temperature before being placed in service. The test for cure was the resistance of the membrane to high-flash naphtha solvent. Each segment was then recorded for the date of installation, as well as the date of application of the lining. It was later decided that the cure could be secured in a 180F temperature, 36 to 48 hours.

The coating had to be free from orange peel to reach the highest efficiency. Pressure was adjusted to between 40 to 70 psi to reduce the orange peel and allow thicker coats to be applied. A 10 day spraying cure was required for a serviceable coating, insofar as chemical and physical damage resistance was concerned.

The spirals were placed in service and used for a period of nine months before the fourth red coat became visible on any member. The application of Atlas Neobon membrane answered the need and surpassed the original predictions or desires for the coating.

New 150,000 gallon water storage tank at Tube Turns, Inc., Louisville, Ky.

Case 57—Kentucky

Minimizing Fire Hazards

LAST year, about $667,536,000 in property went up in smoke. Included were hundreds of factories, suddenly crippled by ravaging flames.

In order to guard against production-stopping fires, all prudent measures are taken in the plant of Tube Turns, Inc., Louisville, Ky. Most of the structures on the extensive grounds are of steel and concrete construction. There is a watchful, amply staffed safety department. Employees are carefully drilled in fire prevention and fire fighting. Blaze-quenching equipment is regularly tested and ready for instant use.

As a further precaution, a 150,000 gallon flat bottom suction type water storage tank has recently been erected. Now, failure of city supply lines in an emergency should not prove to be a major handicap. The tank has butt-welded shell seams, and its bottom and roof are lap-welded. The bottom and shell were fabricated of ¼-in. plate and the top is a 30° radial cone. The tank, which rests upon a sand base, is 30 ft in diameter and 30 ft high.

In an adjacent 15 x 20 ft concrete block pump house is a 1000 gpm pump and and an automatic hot water boiler. The pump will go into immediate action should city water pressure drop dangerously. The boiler maintains the stored water at approximately 50 F. during freezing weather. The pump house also has facilities for the maintenance of portable fire fighting equipment.

Case 58—Kentucky

Variety of Sawing Jobs

WHEN Magnavox, manufacturers of radio, telephone and phonograph equipment, opened a new speaker plant at Paducah, Ky., Maintenance Foreman John Anderson had a problem: he needed equipment which would do a great variety of maintenance jobs but would take minimum space away from production operations.

For all sawing operations, therefore, he installed a Delta radial arm saw which has been used for making work desks, tables, drawers, shelves, die racks, wooden jigs, wedges for the shipping department, and for making export boxes. Because of the variety of cuts possible it takes the place of several other specialized saws that would normally be used.

For more detail on these plant case histories (equipment or evaluation of results) write Southern Power & Industry, 806 Peachtree St., N.E., Atlanta 5, Georgia.

There's No Catch in It!

What is it? It's a plastic model of the amazing new "Bladeless" impeller developed by Fairbanks-Morse pump engineers for Figure 5400 solids-handling pumps.

Why no catch in it? Because, unlike conventional impellers, there are no blades to catch and hold fibrous trash. It makes possible a truly "non-clog" pump. The chain in the illustration follows the water path through the single channel impeller and shows clearly that there's no "catch" possible. And that's important from a maintenance and operating cost angle because the ordinary solids-handling pump often must be dismantled as much as twice daily to clear clogged impellers.

This new advance in pump design is typical of the constant research and product improvement that make possible the high quality and efficient performance of all Fairbanks-Morse products. Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago 5, Illinois.

Fairbanks-Morse Figure 5400 solids-handling pump, featuring the "single channel" impeller. Phantom view of impeller clearly shows that there are no "blades" to catch or damage pumped material.

FAIRBANKS-MORSE,

a name worth remembering

PUMPS • SCALES • ELECTRIC MOTORS AND GENERATORS • DIESEL LOCOMOTIVES • DIESEL, DUAL FUEL AND GASOLINE ENGINES • HOME WATER SERVICE EQUIPMENT FARM MACHINERY

Section 6
Power Transmission

Powering huge belt-driven chipper drive . . speed reducers replace many open gear and belt drives . . textile mill converts to ball bearings . . power costs reduced 50 per cent in cotton gin by application of v-belts

Case 59—Georgia Paper Mill

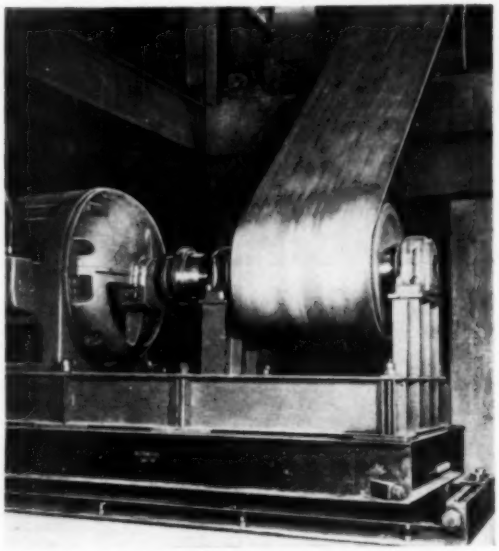
Trouble-Free Chipper Drive

ONE of the South's larger paper mills recently installed this huge belt-driven Carthage Chipper Drive. More important than the tremendous size is the unusual combination of engineering practices used to achieve efficient, trouble-free power transmission.

The drive is powered by a 400 hp, 720 rpm wound rotor motor that has a permanent external resistor (15 per cent) inserted in the rotor circuit. The motor is connected to the driver pulley shaft by a flexible coupling. All bearing pressure from belt tension is evenly distributed between the two pedestal bearings on which the driver pulley shaft is mounted. Because this arrangement protects the motor from all belt load due to tension a standard short shaft motor is used.

Uniform Pulling Power

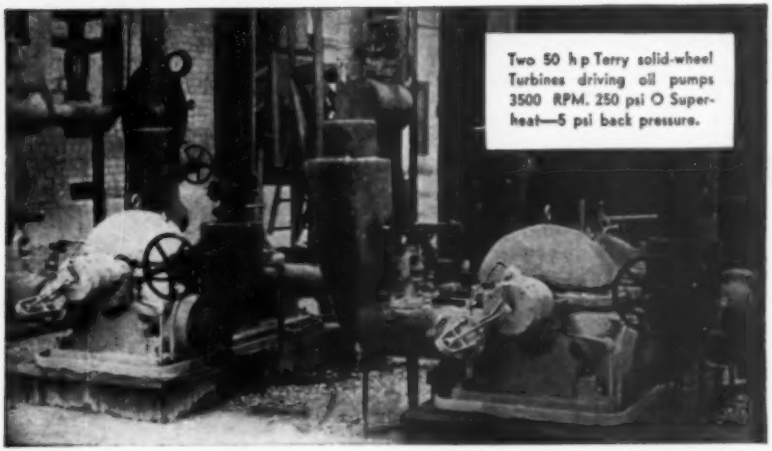
The entire drive—motor, flexible coupling, pedestal bearings, driver pulley and shaft are rigidly mounted on a fabricated steel base, which in turn, is mounted on a pivoted motor base. This specially constructed Rockwood motor base maintains the proper tension on the Tannate leather belt regardless of changes in load, a factor to be considered on all belt driven Chipper Drives. It is particularly important on this installation because power surges of double the full load torque from the 400 hp motor are not uncommon. The weight of the motor is the principal factor in maintaining this uniform pulling power across and around the pulleys, resulting in the full transmission of power at all times.



Motor shaft on this drive is approximately 6 ft above the floor line. Base on which the motor is mounted is about 10 ft long and weighs nearly 5 tons. The J. E. Rhoads & Sons tannate leather belt is 36-in. wide and 4 plies thick.

The entire installation was designed to provide maximum efficiency, minimum maintenance, and long service life. Reports from the mill indicate complete satisfaction.

TERRY



Two 50 h p Terry solid-wheel Turbines driving oil pumps 3500 RPM. 250 psi O Superheat—5 psi back pressure.

LARGE BLADE CLEARANCES GIVE ADDED DEPENDABILITY

Terry Turbine blades have the protection of generous radial and axial clearances. Axial clearance is so large — a full inch — that end play can do no damage.

Projecting rims at both sides of the wheel give further protection to the rotor buckets. Should clearance become reduced, these rims will take rubbing without damage to the blades.

This construction also makes frequent inspection of thrust bearings unnecessary.

A request on your business letterhead will bring you Terry Bulletin S-116 giving detailed information about these features and other Terry Turbine advantages.

If you have a specific turbine drive job in mind, our district Terry representative will be glad to discuss it with you.

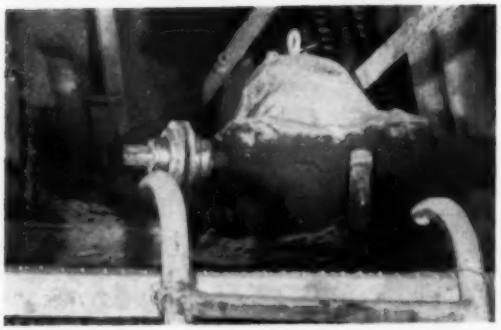
T-1174

THE TERRY STEAM TURBINE COMPANY
TERRY SQUARE, HARTFORD, CONN.

Case 60—Alabama Cement Plant

Speed Reducers Increase Production

Many open gear and belt drives replaced with speed reducers.

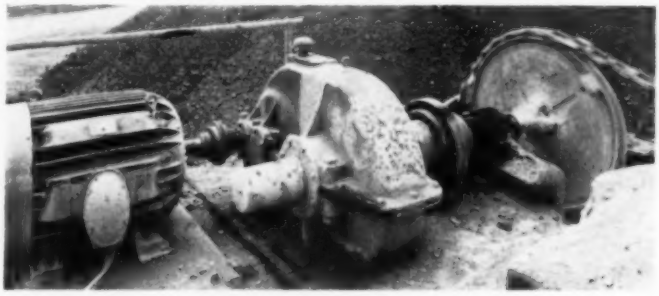


Typical installation at the National Cement Company at Ragland, Alabama is the illustrated Falk Corporation 6DA unit which has driven one of the clinker elevators since 1937. In 14 years, the company has had no trouble with this unit which operates 24 hours a day, except for brief periods of down-time for kiln repairs. A Falk Steelflex coupling between the motor and reducer helps to cushion the shocks.

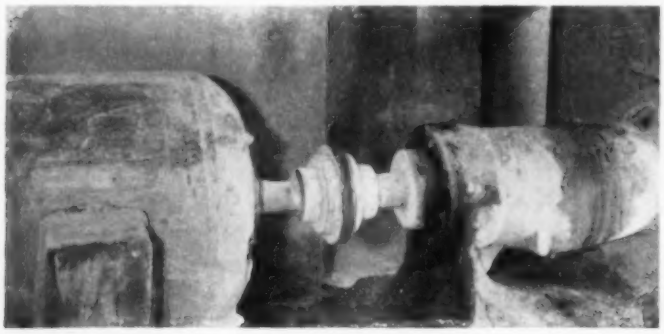
PRESENT annual rate of production at the National Cement Company at Ragland, Alabama, is 1,750,000 barrels. No newcomer to the industry, this firm started a modernization program in 1931 designed to increase production and to reduce maintenance costs.

Vital to the success of their program was the installation of machinery and equipment that would produce under the three characteristics of cement mill operation: heavy shock loading, continuous operation, and dusty atmospheric conditions. Over the years, many open gear drives and belt drives were replaced with speed reducers, the great majority of which are units manufactured by The Falk Corporation of Milwaukee, Wisconsin. Typical installations are illustrated.

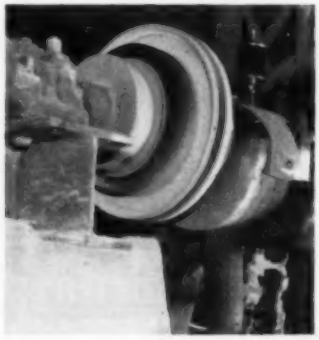
The management has increased production and saved many dollars of maintenance expense by employing the advanced engineering concept of torsional resilience in practically all of their mechanical drives. They have accomplished these benefits by installing Falk Steelflex couplings to absorb shocks, to reduce impact torques, and to accommodate shaft misalignment. Bearing replacement expense has been greatly reduced.

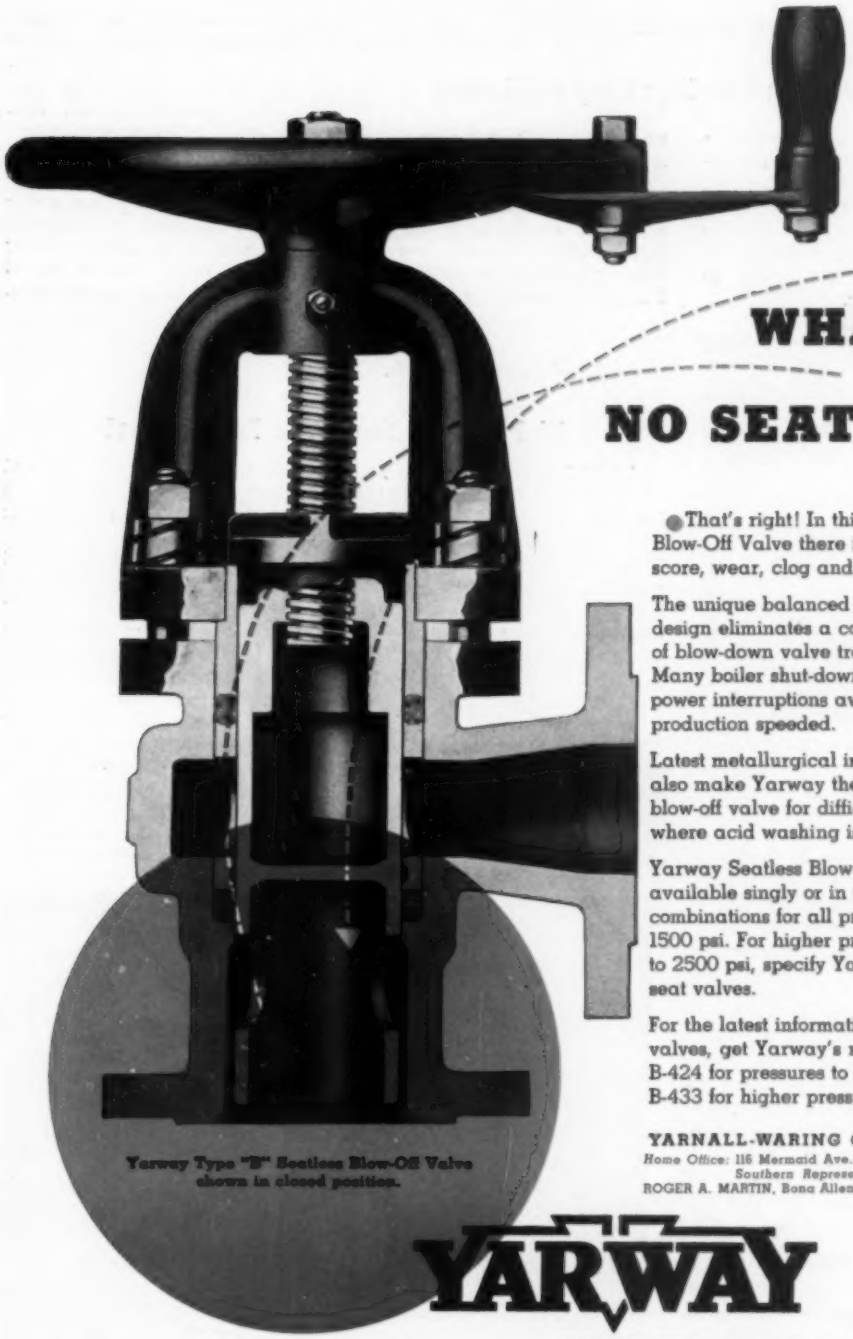


This Falk speed reducer is employed on another application where continuous operation is essential—the clinker drag which transports the entire output of the five kilns. This unit replaced a troublesome belt and open gear drive. Note the Falk Steelflex couplings on both high and low speed shafts. The illustration below shows an installation of a Falk Steelflex coupling. Life of the pump bearings has been increased approximately tenfold.



In the finishing mill, drive shaft from the 350 hp motor is nearly 20 ft long. Installation of a 190F Falk coupling greatly reduced shaft and bearing troubles previously experienced. Motor shaft and bearing failures have been practically eliminated throughout the National Cement Plant at Ragland, Alabama.





Yarway Type "B" Seatless Blow-Off Valve shown in closed position.

WHAT ?

NO SEAT ?

That's right! In this Yarway Blow-Off Valve there is no seat to score, wear, clog and leak.

The unique balanced sliding plunger design eliminates a common cause of blow-down valve trouble—the seat. Many boiler shut-downs are saved . . . power interruptions avoided . . . production speeded.

Latest metallurgical improvements also make Yarway the ideal blow-off valve for difficult service where acid washing is used.

Yarway Seatless Blow-Off Valves are available singly or in tandem combinations for all pressures up to 1500 psi. For higher pressures up to 2500 psi, specify Yarway Stellite-seat valves.

For the latest information on blow-off valves, get Yarway's newest catalog—B-424 for pressures to 400 psi, B-433 for higher pressures.

YARNALL-WARING COMPANY
Home Office: 116 Mermaid Ave., Philadelphia 18, Pa.
Southern Representative:
ROGER A. MARTIN, Bona Allen Bldg., Atlanta 3, Ga.

YARWAY

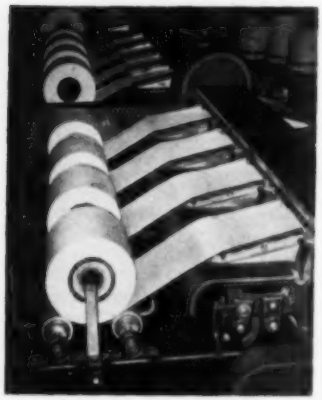
BLOW-OFF VALVES

STOP BLOW-DOWN TROUBLES—KEEP BOILERS ON THE GO

Case 61—North Carolina Textile Mill

Anti-Friction Bearings Stop Oil Leaks

A LITTLE oil goes a long way in the modern textile mill, especially oil that has to be squirted regularly on old-fashioned plain bearings. A crew of responsible workers can be tied to oil cans for anywhere from once-a-shift to once-a-week oiling.



This North Carolina textile mill converted to ball bearings — Fafnir grease-lubricated Ball Bearing Units with Mechani-Seals.

Excess oil can be dangerous if it gets onto a floor where workers are constantly walking. It can be profit-consuming when it leaks from the bearings onto expensive yarns or finished textiles, and, with fly collecting an oil-ooze, there's always the hazard of high torque, scored shafts and worn bearings.

On high speeds it is today considered an absolute necessity to apply anti-friction bearings to provide not only for the load but also for the lubricant. They lend greater freedom of motion and easier starting to many moving parts of textile machines.

Conversion

To eliminate this costly and hazardous oil leakage and to gain the advantages of anti-friction bearings prompted a leading textile mill of North Carolina to convert to ball bearings. Using Fafnir grease-lubricated Ball Bearing Units with Mechani-Seals grease was positively retained, contaminants excluded.

When they specified these standard power transmission units, the engineers avoided designing and building special housings and lubricating systems. In addition, the Fafnir wide inner ring ball bearing with self-locking collar, incorporated in all the units, obviated the necessity of shaft shouldering, lock-nuts, washers, sleeves and adapters. Installation was fast, simple, and inexpensive.

In operation, the Fafnir ball bearing units have proved extremely clean. They are space-savers, have made roll starting easier, and roll operation smoother and more even. They've needed lubrication only about once a year.

Case 62—Texas Cotton Gin

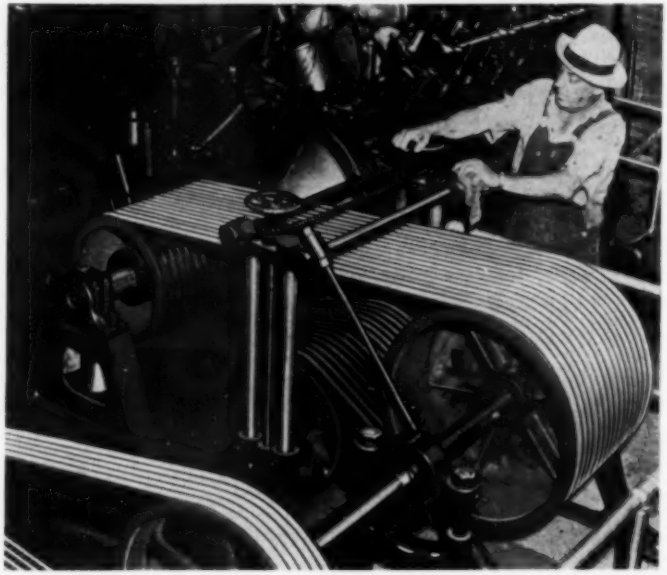
50 Per Cent Saving in Power Cost

A LARGE steam engine was formerly direct-connected to a lineshaft which ran the machinery in the Rhineland Co-op Gin at Rhineland, Texas. But a survey convinced Mr. A. J. Kuehler, General Manager, that changing from steam to natural gas would cut his power costs from $1.00 to less than 50c per bale, besides saving boiler operation expense.

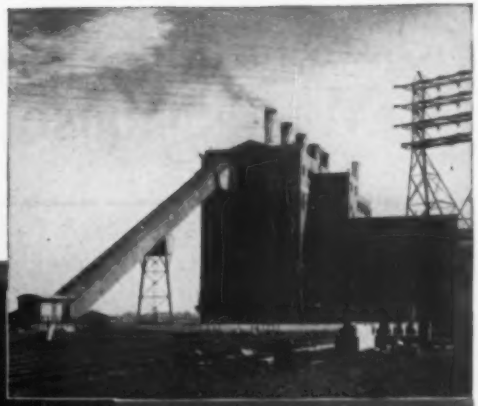
Because the gas engine Mr. Kuehler planned to use ran faster than the old steam engine, some speed-reducing drive — one that would withstand shock loads and be unaffected by the layer of cotton linters that settled on everything —needed to be used.

The Gates field engineer pointed out that the resiliency of the V-Belt drive would absorb shock loads; and because V-Belts run in multiple, failure of one belt would not shut down the gin. Moreover, requiring no belt dressing, the V-Belts would not collect any grit or cotton linters. The Gates man then suggested the installation of the compact Gates Vulco Rope Drive.

V-Belts, supplying the speed reduction necessary to change from steam to a natural gas engine to drive this lineshaft, made possible a 50 per cent reduction in power costs.



To Safeguard Your Plant
COAL HANDLING MUST BE RIGHT
Buy Time-tested Units



This power station of a large Public Utility depends upon Jeffrey coal and ashes handling machinery for day-in and day-out service. They can take no chances. At left, a Jeffrey Belt Conveyor and below a Jeffrey Weigh Larry.

- Ash Handling Systems
- Belt Idlers
- Bin Valves
- Bucket Elevators
- Car Pullers
- Chains and Sprockets
- Crushers and Coke Sizers
- Conveyors — Apron, Belt, Drag, Pivoted Bucket, Spiral and V-Bucket types
- Drive Arrangements
- Feeders — Apron, Belt, Spiral Electric Vibrating
- Pulverizers
- Silo Storage Systems
- Skip Hoists
- Track Hoppers
- Transmission Machinery
- Weigh Larries

Breakdowns are costly . . . failure especially during peak-load periods can be just as disastrous as the failure of the power generating equipment. We know that coal handling machinery must be right . . . have hundreds of installations to prove it. Let Jeffrey safeguard your plant . . . there is an efficient system (or unit) for every type and size of plant. Also equipment for taking away the ashes. For greater efficiency and savings in cost . . . better see us.

JEFFREY

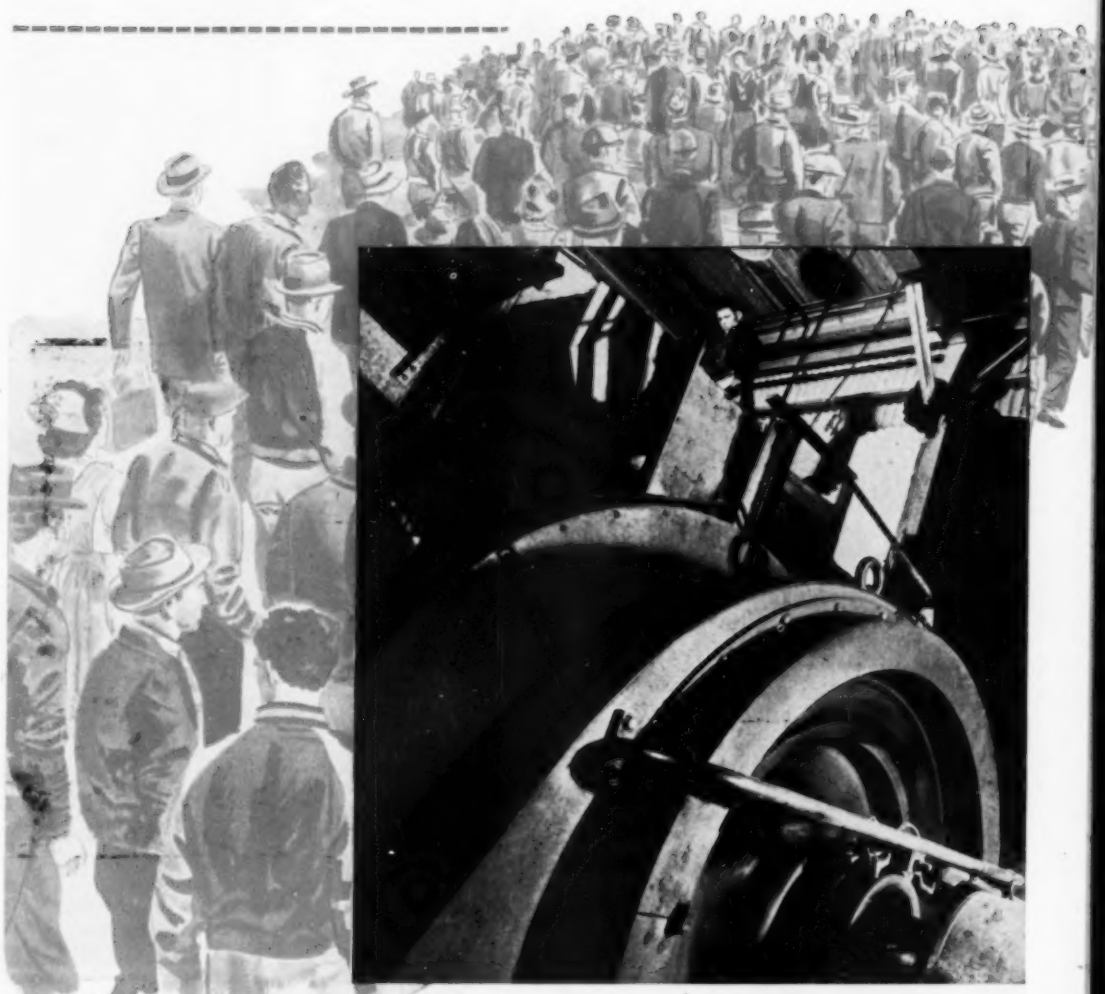
MANUFACTURING COMPANY · ESTABLISHED 1877

898 North Fourth St., Columbus 16, Ohio

Complete Line of Material Handling, Processing and Mining Equipment

YOU CAN BE **SURE**.. IF IT'S

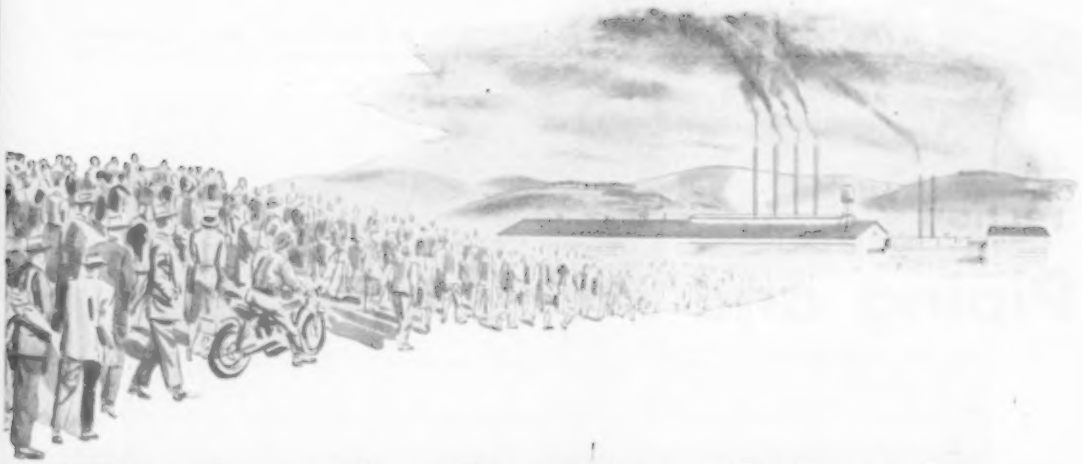
Westinghouse



SOUTHERN PAPER—MORE PLANTS, PEOPLE, PROFIT

Growing factor in the Southern economy is the paper industry. In the past eleven years, its labor force has doubled and dollar volume increased almost six times!

Westinghouse helps paper mills solve production problems, helps them grow. For example, the big motor above, at Camp Manufacturing Co., Franklin, Va., drives a log chipper which chews up 22-inch logs like a giant's pencil sharpener. The logs fall 10 feet, crash into whirling knife blades with a battering-ram impact. No ordinary drive motor would take it, so Westinghouse engineers designed a 250-hp motor with a tremendous built-in flywheel effect. This motor stores up energy, stands the impact and keeps Camp turning out chips for paper production.



Why has the Southern labor force jumped 50% since '39?

Count up the production workers in the South—the men who turn out the goods. Since 1939, they've increased by *one million men,* a better than 50% gain. They're on the job in new plants and expanded plants—because abundant raw materials, good markets and transportation make the South an excellent place to do business.

Early in our company's history, Westinghouse realized these advantages and built manufacturing plants in the South. Today our 15 Southern plants pay wages to almost 8,000 employees. They buy raw materials from Southern mines, mills, farms and forests. And they produce top-notch electrical equipment that helps *other* industries expand in the South.

Abundant power is one of the big factors in Southern growth. And much of the apparatus generating the South's power was engineered by Westinghouse. At the same time, the best in electrical-*using* equipment supplied by Westinghouse helps Southern industries get the most *out of* this power. The paper mill equipment on the opposite page is a good example.

Westinghouse has deep roots in the South, a basic stake in its future, and a firm understanding of the problems of Southern industry and power. And that makes your Westinghouse office a good place to go when you have a job for electricity. J-92016

Westinghouse

A BASIC PART OF THE SOUTH

Section 7
Piping and Accessories

Oxy-acetylene cutting machine reclaims pipe flanges . . aluminum pipe shows excellent corrosion resistance . . expansion joints eliminate breakage . . snubbers for gas compressors . . copper welding technique

Case 63—Georgia Paper Mill

Beveling Rig Reclaims Pipe Flanges

MILL changes in the pulp and paper industry are frequent. This generally means that pipe layout changes are made, calling for cutting down and relocating the pipe. Normally in tearing down or cutting out sections for rerun, the flame-cutting process is used with hand-operated blowpipes, thus leaving very rough cuts, not suitable for welding.

In order to reclaim pipe flanges, the Macon Kraft Company of Macon, Georgia, has devised a unique method of re-using without machining. An Oxweld CM-16 Cutting Machine, marketed by Linde Air Products, a Division of Union Carbide and Carbon Corporation, has been modified by this purpose. The cutting machine, with its wheels removed, is placed on a special stand, as illustrated. It supplies the motive power for rotating the pipe flange being flame-cut. The cut is a bevel, cut to feather edge which prepares the flange for butt welding to a similar piece of pipe. As shown, the cutting blowpipe and nozzle are stationary.

Versatile Unit

The large faceplate is equipped with two sets of slots for gripping either large or small size flanges. After flange-gripping brackets are positioned on the faceplate for a particular size flange, all flanges of this same size can be cut without re-positioning the brackets. All that needs to be done is to loosen and tighten the set screw on the top bracket. The cutting blowpipe is supported in the proper relative position with respect to the pipe flange being cut by a blowpipe holder mounted to a pipe-type bracket which, in turn, is mounted in the normal blowpipe position of the CM-16 Cutting Machine. All parts that carry the gases to the blowpipe are kept free of oil, grease and dirt.

The practice at Macon Kraft Company has been to "borrow" the CM-16 Cutting Machine from the plate yard. This is done when enough flanges have been assembled to provide a half day of cutting. This occurs approximately every two weeks. It takes only five minutes time to modify the CM-16 machine and install it in the special cut-off rig.

A CM-16 Cutting Machine and standard blowpipe as adapted by Macon Kraft to reclaim necked pipe flanges. The blowpipe holder and rack tube are part of the standard CM-16 heavy-cutting attachment. With the two sets of slots in the large faceplate, flanges of varied sizes can be fastened by slight adjustments in the position of the gripping brackets.

The simplicity and efficiency of this application of an oxy-acetylene cutting machine indicate its general utility in the pulp and paper industry.

These "CRUSHING" FACTS

Another
American Crusher
CASE HISTORY

PLACE: Illinois Coal Mine

AGE OF CRUSHER: 14 years

TOTAL TONNAGE CRUSHED: 1,472,805

TOTAL COST PER TON: one half of 1¢*

—again prove

AMERICAN CRUSHER performance

*

The total cost figure for the 14-year coal crushing operations of the Illinois coal mine, whose American Crusher record is shown above, includes: original cost of crusher (completely depreciated); plus cost of replacement parts; plus maintenance costs; plus interest on original investment (at 3% for 14 years).

But here is the really significant fact: an independent survey of Users of American Equipment has shown that this performance record is a typical one for Americans . . . a consistent pattern of high tonnage reduction at remarkably low parts-replacement cost.

Only such features as the exclusive Crushing Ring Design . . . originated and perfected by American . . . could reduce coal in power plants and coal mines across the country year after year, ton after ton, *for less than 1¢ per ton.*

Find out how you may reduce the cost of your own crushing problems. WRITE for detailed information and illustrated literature.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1243 Macklind Ave.
St. Louis 10, Mo.

Case 64—Alabama

Aluminum Pipeline Resists Corrosion

RECENT uncovering of the 40 ft bare aluminum bypass installed approximately seventeen months ago in the Alabama-Tennessee Natural Gas Company's 8-in. aluminum pipeline revealed absolutely no discoloration or corrosion of any sort. This section of pipe was installed with special bypass valves so that it could be dug up at intervals without disturbing the operation of the main pipeline serving Reynolds Listerhill, Alabama, plant.

After being uncovered, the section was brought out. Careful inspection both inside and outside was made to determine any sign of wear or corrosion. No discoloration or corrosion of any sort could be found on the outside, where the bare pipe was in contact with the soil; nor on the inside, which carried natural gas. The test period was approximately seventeen months.

The test was supervised by the officials of the Alabama-Tennessee Natural Gas Company and representatives of Reynolds Metals Company, who supplied the pipe. Based on this inspection, all concerned agreed that this pipe would last indefinitely under such conditions.

Section of the Alabama-Tennessee Natural Gas Company's 8-in. aluminum pipeline uncovered after 17 months service.

Case 65—Texas

Resistance to Abrasion

A NEW seven-story building, part of the projected $3,000,000 rehabilitation program of the Imperial Sugar Company at Sugar Land, Tex., contains a maze of piping and a wide variety of equipment, a large portion of which is made of wrought iron. Here, the problem was mainly one of resistance to abrasion, rather than of corrosion resistance.

View during construction of the new seven-story building of the Imperial Sugar Company at Sugar Land, Texas, showing two of the vacuum pans in place. The vacuum pans are the ones with the vertical row of "eyeglass port holes" to check the level of the syrup. The space at extreme right of the building is to be occupied by a third vacuum pan.

A total of 130 tons of wrought iron plates, ranging in thickness from 5/16 inch to 1 inch, and an undetermined amount of wrought iron pipe were used in the new building. Some of the plates were fabricated into vacuum pans and crystallizers for the conversion of the sugar cane syrup into massecuite. Massecuite is the concentrated syrup containing sugar that has been crystallized.

The vacuum pans, of which there are three, are of upended cylindrical construction, and each is fitted with a row of seven "eyeglass port holes" for checking the level of the syrup and massecuite, spanning the height of the cylinder. The extreme operating capacity of the vacuum pans is 1,000 cu ft each of boiling massecuite of 95 per cent solids, for a total of 90,000 lb.

Portion of a calandria, the heating element of one of the vacuum pans, showing the tubes which run between the heads of the "drum". Steam circulates inside the "drum", but outside the tubes, and the syrup circulates inside the tubes. This equipment is used to boil the syrup down into the concentrated massecuite.

Inside each vacuum pan is a wrought iron calandria, a drum with tubes running between the heads of the "drum." The calandria is the heating element of the vacuum pan. Steam circulates inside the "drum" and around the outside of the tubes, with the syrup inside the tubes and around the outside of the calandria. The heat of the steam is thus transferred to the syrup, boiling it down into the concentrated massecuite.

Case 66—Georgia

Expansion Joints Eliminate Breakage

PROBLEM at the Union Bag and Paper Corporation, Savannah, Georgia, had been the crystallization or breaking of steel pipe connecting the dissolving tanks and pumps. When the vibration from the tanks cracked the pipe or broke the connection with the pumps, leakage of the solution occurred and a high maintenance was involved.

Plant engineers installed U. S. Rubber Company Expansion Joints which have flanged ends and can

GRAVITY WATER PRESSURE for North Carolina fertilizer plant

THE 60,000-gal. Horton elevated tank shown above was recently erected to provide better water service at the Statesville, North Carolina, fertilizer plant of the Robertson Chemical Company.

Horton elevated water tanks offer many advantages to the industrial plant that often mean greater efficiencies and timely savings. With elevated storage, you have the assurance of more uniform water pressure throughout the day. You also have a reliable gravity pressure water reserve which, when coupled with an automatic sprinkler system, provides better fire protection.

Look into the benefits of Horton elevated tanks. You can save on operating and insurance costs—yet realize long term economy, safety and convenience with these modern structures. Standard capacities range from 15,000 to 500,000 gallons.

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3.....2180 Healey Bldg.
Birmingham 1.....1231 North Fiftieth St.
Boston 10.....1044—201 Devonshire St.
Chicago 4.....2107 McCormick Bldg.
Cleveland 15.....2218 Guildhall Bldg.
Detroit 26.....1534 Lafayette Bldg.
Houston 2.....2132 National Standard Bldg.
Los Angeles 17..1545 General Petroleum Bldg.
New York 6.....3312—165 Broadway Bldg.
Philadelphia 3....1646—1700 Walnut St. Bldg.
Salt Lake City 4.....545 West 17th South St.
San Francisco 4.....1531—200 Bush St.
Seattle 1.....1346 Henry Bldg.
Tulsa 3.....1628 Hunt Bldg.
Washington 6, D. C.....1114 Colorado Bldg.

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA. In Canada—HORTON STEEL WORKS, LIMITED, PORT ERIE, ONT.

be bolted right into the pipe lines. The duck and rubber flanges are backed up with split steel retaining rings to give uniform pressure by the bolts over the surface of the flanges.

These joints are designed to prevent excess stressage due to expansion and contraction, to insulate against vibration and to prevent the transmission of undesirable sound. They operate satisfactorily under both axial and lateral movement.

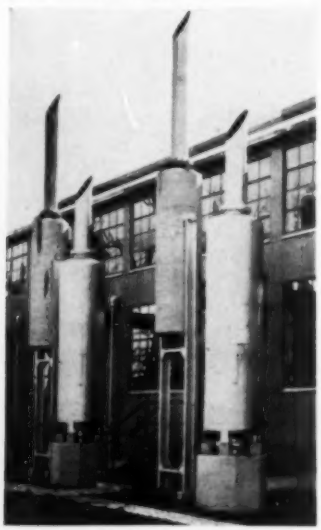
Since the installation of the expansion joints, Union Bag has experienced no difficulty in pipe or pump breakage nor with the resultant loss of production.

Case 67—Louisiana

Snubbers for Gas Compressors

COMBINATION air intake snubber cleaners are currently being installed by many of the new cross-country pipe line companies to remove pulsation from the air intake systems to the gas engine driving compressors, and also to clean the air to the engines. The mechanical feature, in addition to noise control, is the ability of the filter to survive the terrific pulse effect of the air drawn into the engine by the large scavenging pumps.

The Burgess-Manning exhaust snubbers and combination air intake snubber cleaners were installed in a Louisiana pipe line compressor station to improve operation and maintenance of gas driven compressors.



Case 68—Missouri

Welding Copper

COPPER is employed on a large scale in the fabrication of piping because it offers excellent resistance to corrodents and is relatively low in cost. But in some process services, the use of copper has been somewhat restricted. It is commonly joined by brazing with bronze or silver, both of which are susceptible to corrosion. Fabricators have successfully welded copper by the oxyacetylene and carbon arc methods, but the high heat conductivity of the metal makes it difficult to maintain a molten pool, and the fluxes do not prevent the deposit of oxides or carbon in the weld zone. Embrittlement or loss of ductility has frequently resulted.

New Method

Recently, however, a technique has been developed that permits copper piping to be satisfactorily welded, and the requirements of the ASME Code Case No. 934 are met. Concurrently, there has been a rise in sales of Tube-Turn fittings of copper and copper alloys, for they offer maximum strength and other time-proven advantages.

A paper dealing with the new technique was presented by John W. Mortimer of the Whitlock Manufacturing Co., Hartford, at the 29th annual meeting of AWS. It bore the title of "Inert Gas-Shielded Arc Welding of Pure Copper," and it aroused wide interest among major chemical companies and fabricators. Mr. Mortimer reported that the inert gas-shielded arc welding technique developed by Whitlock had produced welds of splendid physical properties. In addition, a chemical analysis of a typical job indicated the weld deposit to be 99.16 per cent Cu. Today, in the Whitlock shop, as well as in several other large shops, welds are made on work up to $\frac{5}{8}$-in. in thickness, and marked savings have been made in fabrication costs.

Case 69—Kentucky

Radiant Heating Piping Material

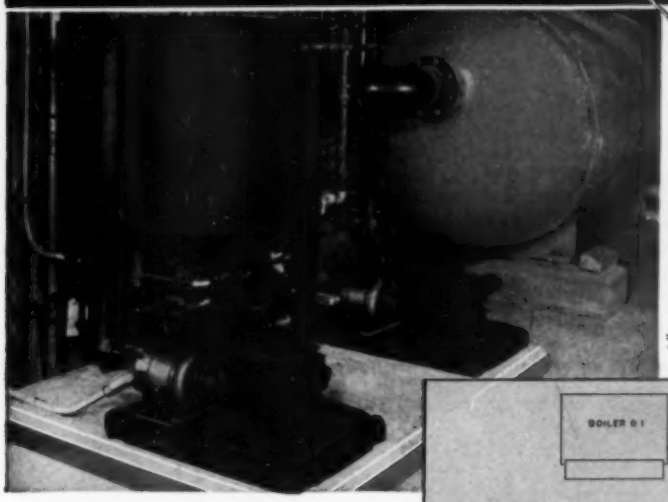
IT is estimated that over 90 per cent of all radiant heating installations are welded. Since the piping is inaccessible once it's imbedded in cement, prudent engineers specify Tube-Turn welding fittings wherever connections are made. Wrought iron has become a widely used RH piping material because it has virtually the same coefficient of expansion as cement and plaster as well as other desirable properties. However, carbon steel and other metals and alloys are preferred by some designers.

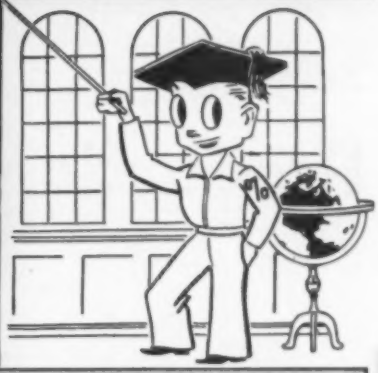
Large Installation

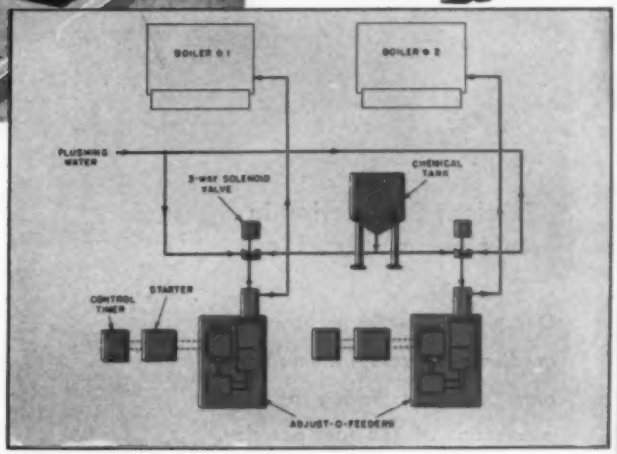
One of the year's largest and best planned radiant heating installations is going into the $5,500,000 Capitol Annex Building now being erected at Frankfort, Ky. B. A. Walterman Company, Cincinnati, is the piping contractor. Wrought iron pipe and Tube-Turn wrought iron welding fittings are employed. The radiant heating coils are $\frac{3}{4}$, 1 and $1\frac{1}{4}$ in. There are 7,160 ft of the first size, 59,990 ft of the second and 15,120 of the third. The sizes of the hot water piping to the coils are $1\frac{1}{2}$, 3 and 6 in.

Here a Tube-Turn tee, manufactured by Tube Turns, Inc., Louisville, Ky., is being welded into the hot water supply line for a bank of radiant heating coils in the new Capitol Annex Building at Frankfort, Ky.

MAKE YOUR BOILER WATER CONDITIONING A ROUTINE AUTOMATIC OPERATION!







%PROPORTIONEERS, INC.%

System is Positive . . . Protecting Your Boiler and Reducing Steam Costs

All equipment shown red in photo and flowgram furnished by %Proportioneers, Inc.%

At Oberlin College this %Proportioneers% installation automatically provides correct boiler water treatment, adding the proper chemical in the correct proportion, at the right point, at the right time. Chemical treatment as applied by the %Proportioneers% system offers the advantages of improved heat transmission, fuel savings, and greatly reduced maintenance for every power plant from the largest high pressure installation to the smallest low pressure job. We supply complete chemical feeding systems including metering pumps, with control panels, chemical tanks, dissolvers and all other units required. Let us assume full responsibility for your complete chemical feeding system.

Write for Brochure SM9020 and Bulletin CAT.

No. 3 in a series on boiler water conditioning.

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Technical service representatives in principal cities of the United States, Canada, Mexico and other foreign countries.

Section 8

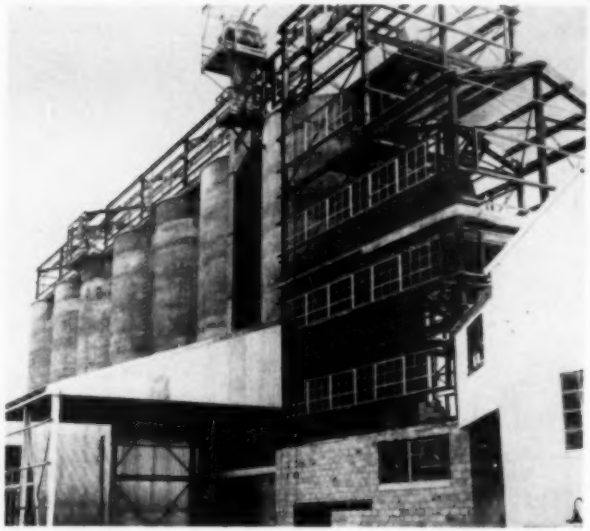
Production Equipment

Hand routing operations . . heating and cooling acids . . brazing techniques . . document reproduction . . wirebound boxes . . order processing . . machining . . alloy substitution . . fan-pump installation meets severe process variables . . rubber lined equipment

Case 70—Oklahoma

Efficient Production in Automatic Batch Plant

One man mixes the necessary ingredients and relays them to two glass furnaces having a total production of 180 tons per day.



General view of the American Window Glass Company's Okmulgee, Oklahoma, plant constructed by The Rust Engineering Company. Note steel framework for penthouse, atop storage bins and mixing house. Two of the seven reinforced concrete storage bins store cullet, two sand, one soda ash, one raw dolomite and one bin is divided into three parts for storage of limestone, feldspar and salt cake.

A CLOSE approach to an entirely automatic plant operation in glass making is the batch plant of the $5,000,000 American Window Glass plant at Okmulgee, Oklahoma, designed and constructed by The Rust Engineering Company, Pittsburgh.

A one man mixing operation is made possible through an efficient batch plant layout using materials mixing and handling equipment that is entirely automatic except for the batch train—four batch buckets carrying ingredients to furnaces on an overhead monorail system.

The batch train is pulled by a special monorail locomotive which requires an operator who spots the trains for loading and unloading, and attends to the gravity-fed bucket loading at the mixer—an operation which involves pulling rods that open and close the hopper spouts.

Since the hopper located under the mixer holds exactly one batch there is no danger of spill-over—a batch of ingredient filling two

Dixisteel staked its future in the South fifty years ago

Today it is not unusual to see new mills, plants, and factories springing up throughout the South.

But it was a different story fifty years ago.

At the turn of the century the South was still licking its wounds, and it took raw courage, deep vision, and a firm faith in the future of the South, to launch a new enterprise—especially one as foreign to the economy of the South as a steel mill.

The men who founded Atlantic Steel Company had those attributes, and time has proven their convictions sound.

Yet without the loyal support of our customers—many of whom we have served since the day we opened our door—we could never have weathered the storms of three major depressions and two World Wars. To them we are most grateful and appreciative.

ATLANTIC STEEL COMPANY • ATLANTA, GEORGIA

PRODUCERS OF FINE-QUALITY LOW-CARBON STEEL PRODUCTS, INCLUDING: HOT ROLLED BARS, SHAPES AND STRIP—DRAWN WIRE—NAILS, RIVETS, STAPLES—FENCE AND BARBED WIRE—FORGINGS AND STAMPINGS

buckets at one time after which the operator moves the train up, spotting the remaining two buckets under the hopper for loading.

A vertical division in the hopper enables half a batch to funnel down each of two main spouts further subdivided into two loading spouts that fit over holes in the top of each bucket.

Dust is eliminated during loading by dust-tight rubber gaskets which collar bucket and spout connections when the operator pulls the rod opening the spouts. In addition, a four-inch diameter light gage vent pipe carries dust from the main spouts up to the mixer.

Batch buckets, hopper and spout arrangements, in fact all the loading equipment, was specifically designed by American Window Glass Company and Rust engineers for this particular operation at the Okmulgee plant.

Process

Three batches of ingredients are in process continuously: one batch in the mixer, which requires about three minutes to finish; one batch in the hopper ready for loading into the batch buckets; and one on its way to the mixer.

The mixer is gravity-fed from a totalizing scale hopper which records every batch of furnace ingredients on a printweigh and dial on the loading floor so the operator can keep a continuous check on materials flow.

The totalizing hopper receives the material by elevator from a belt conveyor located under the storage bins which unload necessary ingredients in their proper amounts through a series of pre-set scales and vibratory feeders.

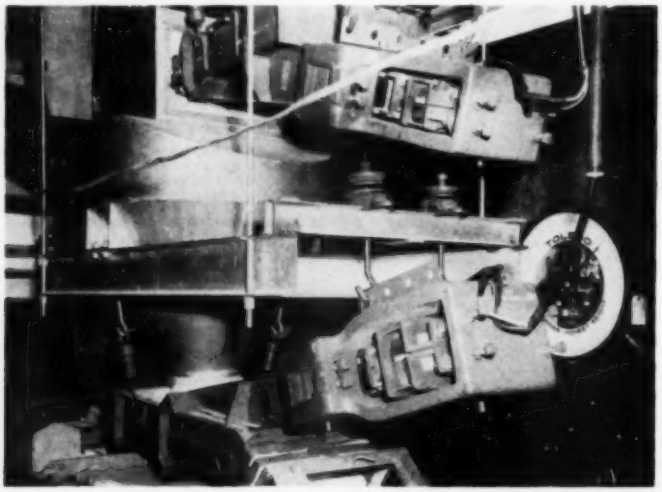
Close Control

A two or three per cent deviation from the normal materials flow, or variance in totalized batch weights to the mixer will not only be recorded on the loading floor printweigh, but will also close a limit switch shutting down the whole operation, thus allowing automatic quantity control.

Raw materials arrive by rail and are carried to the storage bins through track hoppers and elevators with shuttle car conveyors in the penthouse distributing the materials to the proper bins.

Principal equipment and materials were supplied by the following: batch buckets and locomotive, *Louden Machinery Co.;* totalizing scale, printweigh and dial, all other scales, *Toledo Scale Co.;* mixer, *Ransome Machine Company;* hopper and spouts, *The Converto Company;* conveyors, elevators, *Continental Gin Company.*

Vibratory feeders and pre-set scales, located under each storage bin, feed ingredients in their proper amounts to the belt conveyor enclosed below. Ingredients are elevated to the totalizing scale hopper and then gravity fed to the mixer.



Case 71—Maryland

Tool Modification Improves Quality

AN improved design of template and machine for hand routing has been developed at The Glenn L. Martin Company by John A. Mattheu of the Sheet Metal Department.

Extra height of router guide and template, prevents over-riding and undercutting.

Hand routing was formerly done with a hand router which was equipped with a guide ⅛ (.125) inch high. The hand router template was made from ⅛ (.125) inch material, the guide resting on the template for the router operation. The operator had very little control of the hand router motor and cutter, so undercutting frequently occurred.

The new method was developed to prevent the router guide from over-riding the template. The height of the guide was increased from ⅛ (.125) inch to 7/32 (.218) inch, and the thickness of the hand router template was increased from ⅛ (.125) inch to ¼ (.250) inch. The extra height of the router guide, together with the extra height of the template, prevents over-riding.

The new method has proved entirely practical, the margin of error on undercutting being minimized by this change.

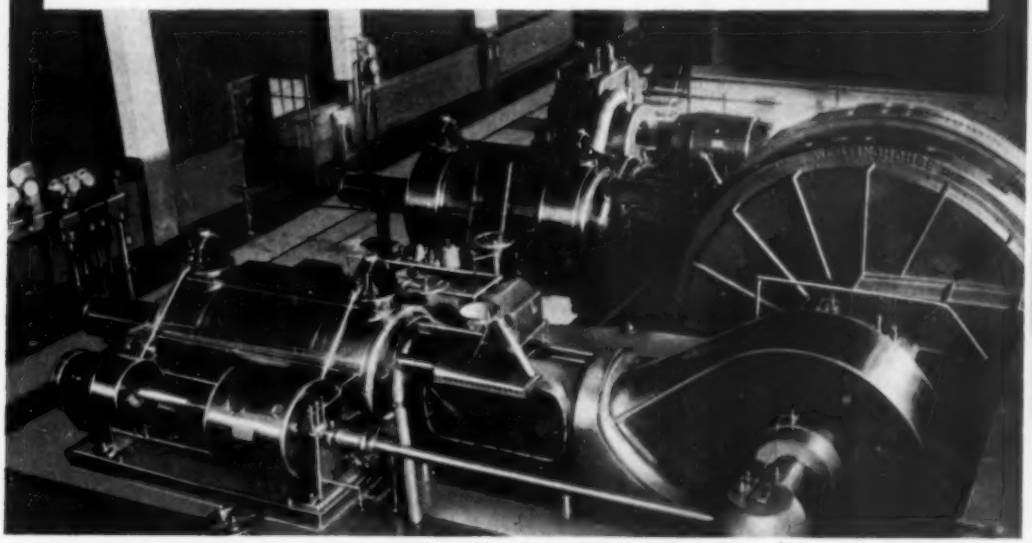
For Extra Fine Lubrication..

use Sinclair Rubilene

Over many years engineers and plant operators have recognized Sinclair RUBILENE® as capable of rendering extra fine lubrication performance in the powerhouse.

Sinclair RUBILENE has always been a top-quality oil, as it has been constantly improved through the years, incorporating the latest technological developments in refining and processing. It resists oxidation under continuous high temperatures, and re-circulation. It separates rapidly from water, and is non-foaming. Through long periods of use it retains its original qualities, providing uniform, trouble-free lubrication and low maintenance costs.

Yes... RUBILENE's finer quality pays dividends. For lubrication counsel, see your nearest Sinclair Representative or write direct to Sinclair Refining Co., 600 Fifth Ave., N.Y. 20, N.Y.



SINCLAIR RUBILENE®

for low maintenance costs

. . . up to the largest

A new wave of enlightened interest in Reheat is sweeping the country as the role of the high pressure, high steam cycle promises to play an increasingly important part in power-generating facilities everywhere. Today, design developments in both boilers and turbines frequently dictate the use of the Reheat Cycle. But the spiralling cost of fuels is as much a factor as any in endearing this tool—so promising from its very beginning—to the hearts of steam-electric station operators.

Radiant superheaters and radiant reheaters were engineered and fabricated by Foster Wheeler as early as 1924 for one midwest station—considered one of the country's most efficient power plants.

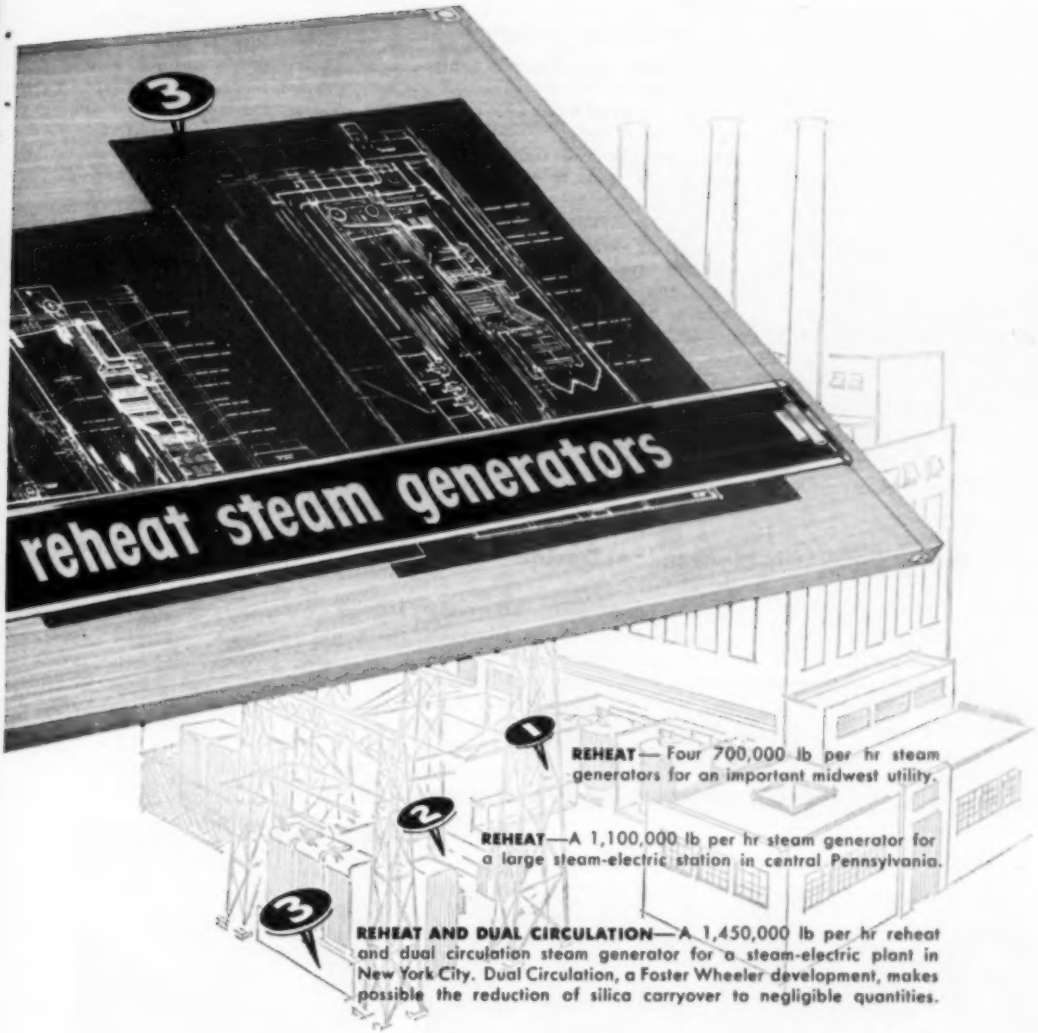
The Foster Wheeler designs shown here have the following common features:

(a) Combination radiant and convection superheaters have a natural characteristic maintaining a constant final steam temperature over a wide load range with a minimum amount of control equipment.

(b) Since superheating is done partly in the radiant superheater a two-fold purpose is served. Gas temperature leaving the furnace can be reduced and danger of slagging is thus obviated.

(c) Steam generator characteristics are integrated with those of the turbine.

For further information, write to: **FOSTER WHEELER**



REHEAT— Four 700,000 lb per hr steam generators for an important midwest utility.

REHEAT—A 1,100,000 lb per hr steam generator for a large steam-electric station in central Pennsylvania.

REHEAT AND DUAL CIRCULATION—A 1,450,000 lb per hr reheat and dual circulation steam generator for a steam-electric plant in New York City. Dual Circulation, a Foster Wheeler development, makes possible the reduction of silica carryover to negligible quantities.

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FOSTER WHEELER

Case 72—Alabama

Heating and Cooling Corrosive Solutions

A NEW method for heating or cooling acid or alkali solutions in the iron and steel industry is the externally mounted heat exchanger unit, which provides continual circulation of solution and efficient heat transfer without acid dilution from steam condensate.

Essentially of the double pipe variety in construction, the exchanger unit utilizes a corrosive resistant inner tube to carry the acid solution which is surrounded by a steel steam jacket. The materials selected for the acid-conducting inner tube depend upon the service. Impervious graphite is one of the most satisfactory from the standpoint of heat conductivity and chemical resistivity. Heat exchangers usually are equipped with acid circulating pumps designed for this service although pumps are available separately in a wide variety of materials, including acid-proof resin, rubber-lined steel, special alloys and the like.

Production Savings

Production advantages of this type of heating include rapid heat-up time; no interior tank space required; heat or cool with same unit; rapid, uniform load response; no snagging by crane or hoist; minimum of steaming over tank; and no rust or oil contamination.

Operating savings include no acid dilution; excellent corrosion resistivity and long life; high heat transfer coefficients; facilitates maintenance; and continual agitation, independent of heat.

Typical report of the savings achieved by the use of heat exchangers manufactured by Nukem Products Corporation of Buffalo, New York, comes from a large Southern steel mill. Steel was being cleaned in 3000 gallon muriatic acid tanks heated by open steam jets. It was found that over 1 lb of steam was needed to raise each gallon of acid in the tank to the desired pickling temperature of 170 F. In order to maintain a uniform acid concentration, this large condensate dilution from the open jets had to be offset by periodic acid additions. After heat exchangers were installed, this excessive acid consumption was eliminated with estimated weekly acid savings of 48 per cent.

Heat exchangers lend themselves easily to automatic control by means of a thermostatically operated valve on the steam or coolant lines and have the further advantage of continual acid circulation independent of the steam control action.

Case 73—Texas Metalworking

Brazing Supplants Mechanical Design

ALUMINUM PRODUCTS CO., of Houston, Texas, fabricates double hung aluminum windows from 63S-T5 extruded aluminum. They are completely glazed, with hardware and screens and marketed under the name APCO.

Mechanical joints, specified in the original design, proved excessive in cost and unsatisfactory. Engineers redesigned the joints for brazing and adopted All-State No. 31 Sheet Aluminum Brazing Rod and No. 31 Brazaloy Flux for the operation. The low working temperature (1050 F) would permit the operation to be performed without danger of burn-throughs. The No. 31 is applied at a temperature much lower than that at which the base metal melts and the No. 31 Flux gives an exact indication of the joint being ready for application of the rod. Girls handle all of the brazing operations.

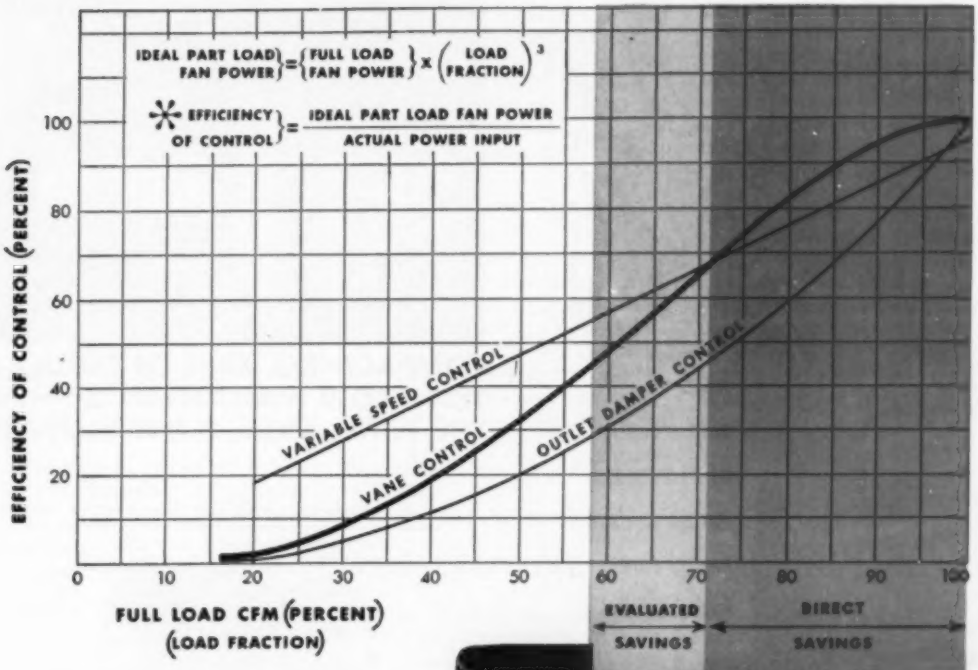
Following brazing, windows are cleaned in a 50 per cent solution of nitric acid, washed clean in water and sprayed with a clear lacquer.

Production line at Aluminum Products Co., Houston, Texas

Close-up of brazing operation using products of the All-State Welding Alloys Co.

FOR PART LOADS

USE STURTEVANT VANE CONTROL® FOR HIGH EFFICIENCY AT LOW COST



If you operate in this range—and most plants do—VANE CONTROL is the economical choice

Have you ever considered the relative efficiencies of methods of mechanical draft fan volume control—and then evaluated them against first cost? Do so, and you will find Sturtevant Inlet VANE CONTROL is the best. It is high in *efficiency of control** and low in first cost.

Whether for forced or induced draft, the *new* VANE CONTROL is a simple and reliable regulator of fan output—a control which responds instantly to varied demands, and yields major power savings at reduced loads.

A new Bulletin, DB 92-810, describes the mechanical improvements developed for Sturtevant VANE CONTROL and its use in mechanical draft, industrial and ventilating applications. Write today for a free copy. Westinghouse Electric Corp., Sturtevant Division, 139 Damon St., Hyde Park, Boston 36, Mass.

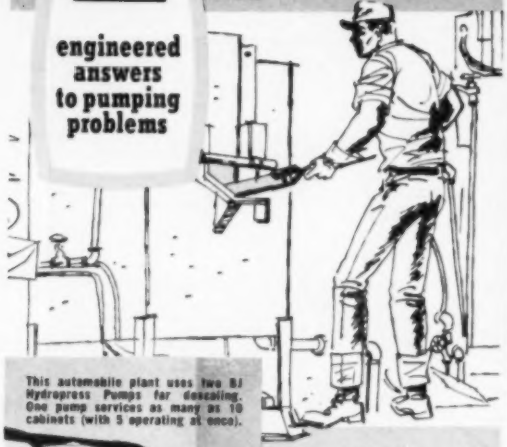
YOU CAN BE SURE...IF IT'S **Westinghouse**

PUTTING *Air* TO WORK

J-80220

KNOCKS OFF SCALE IN BJ 1½ SECONDS!

engineered answers to pumping problems



This automobile plant uses two BJ Hydropress Pumps for descaling. One pump services as many as 10 cabinets (with 5 operating at once).

Auto industry uses BJ Hydropress Pumps to descale forged parts hydraulically!

Manual or mechanical descaling operations are time-taking and profit-robbing. Especially when a product requires several descalings during production. You'll save time, money and rejects by descaling hydraulically with BJ Hydropress pumps.

Here's one of the many examples of modern hydraulic descaling as used by the automotive industry. During the heating of axle bars prior to forming, scale is created and must be removed. This is done in a hydraulic descaling cabinet. As the bar is inserted, a lever is tripped and high velocity water at 1500 to 2000 psi hits the bar from 3 to 5 nozzles. Scale is removed in 1½ seconds! Afterwards the hot bar is placed on a forming roll.

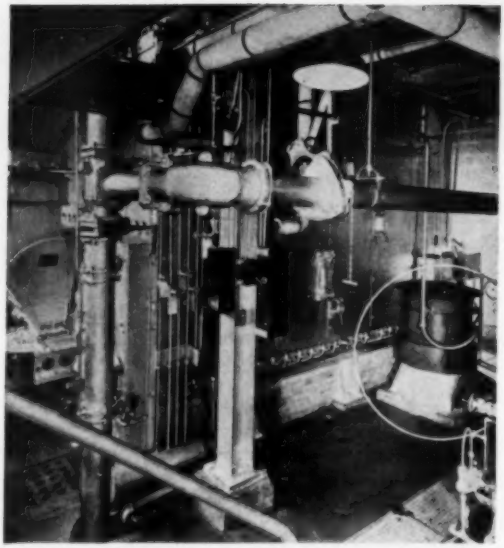
The BJ Hydropress pump is ideal for this type of work because of its unique construction features. It does not require relief valves, accumulators or extra heavy fittings and piping. Its double volute design creates inherent balance at all heads and capacities. Its vertical construction allows the use of a simple foundation and a minimum of floor space.

For more information call your local BJ sales engineering office or write:

Byron Jackson Co.

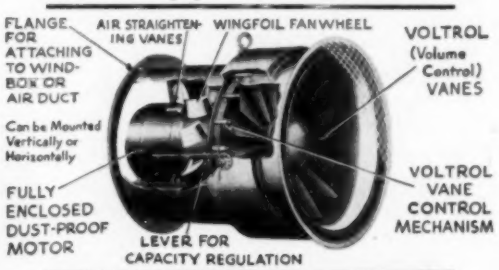
P. O. Box 2017, Terminal Annex, Los Angeles 54, California

Sales Offices in Principal Cities



COMPACTNESS, EASE OF REGULATION, LOW MAINTENANCE—IN THE WING AXIAL FLOW BLOWER

WING AXIAL FLOW BLOWERS are used on many of the country's leading makes of boilers as standard equipment. The reason lies in the


FLANGE FOR ATTACHING TO WIND-BOX OR AIR DUCT
AIR STRAIGHTENING VANES
WINGFOIL FANWHEEL
VOLTROL (Volume Control) VANES
Can be Mounted Vertically or Horizontally
VOLTROL VANE CONTROL MECHANISM
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LEVER FOR CAPACITY REGULATION

consistently satisfactory performance Wing Blowers have been delivering for over half-a-century—plus many superior features of Wing design, such as the volume control (Voltrol) vanes, permitting capacity regulation down to 10% of maximum. Write for complete details and latest bulletin.

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Offices in Principal Cities

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AXIAL FLOW BLOWERS

Case 74—Virginia and Texas

Drawing and Document Reproduction

PHOTOGRAPHY is lowering costs and increasing efficiency in many types of industrial operations.

During the year the aspect of photography which showed some of the most astounding developments was the use of silver sensitized photographic papers in drawing and document reproduction.

Papers such as Eastman Kodagraph Autopositive Paper for example have gone far toward simplifying and speeding this tedious and heretofore costly operation.

A telephone company faced the problem of reproducing charts that had variable line density. The old technique was for girls to remake the charts and to make changes or additions on the new drawings. Now, however, a silver sensitive photographic intermediate is made as easily as a blueprint—and on standard reproduction equipment—then corrections and additions are made directly on this intermediate. Copies of these corrected drawings are then turned out in any quantity desired on a standard diazo print machine. Since the process definitely strengthens the legibility of old or shop-worn drawings, the copies are often better than the originals.

Other Techniques

This same telephone company is using the same technique to cut redrawing time with maps and to permit quick and easy changes and reduced costs. It also uses photographic films originally designed for photo-lithography to quickly and inexpensively make an intermediate—and then multiple copies —from positive photostats on diazotype machines.

An aircraft corporation uses Kodagraph Autopositive Paper for the production of intermediates from both old drawings and new drawings. These intermediates are used instead of the originals for file purposes, and for use in making many copies and prevent valuable originals from being damaged or lost. This procedure, they have found also expedites defense orders since it permits changes to be made rapidly and inexpensively, as necessary, directly on the intermediates. Since this company also faced the problem of supplying numerous copies of drawings and specifications to sub-contractors, they have also used the new paper extensively to speed such production. They have found it well adapted to the production of quicker reflex copies of typewritten material which may be on an opaque surface or written on both sides.

Case 75—Virginia Fertilizer Company

Standard Buildings Simplify Expansion

A LARGE fertilizer company in Richmond, Virginia, recently completed the erection of this new building, designed and manufactured by the Luria Engineering Corporation, New York, N. Y.

Although the design of the building is special in many respects —to meet the specific needs of the fertilizer industry—it is essentially a standard building, and Luria was able to meet all specifications with only a few modifications in their standard line of steel-frame industrial buildings. The fertilizer company was therefore able to make substantial cost savings by eliminating most of the engineering expense normally associated with a specialized structure of this type. Additional cost savings were effected by the use of standard structural members designed for production with a minimum of fabrication expense.

Fast Erection

The entire frame of the building was completely fabricated in Luria's Bethlehem, Pa., plant, and delivered to the building site all ready for fast erection. All-bolted frame construction, with fewer and stronger structural members, cut erection time far below that which would have been required for ordinary construction. It is a rugged, permanent structure, designed to meet all local building code requirements. The corrugated asbestos cement roofing and siding is extremely durable and resists weathering almost indefinitely without further maintenance.

Entire frame of this Richmond, Virginia, fertilizer building was plant fabricated and delivered to building site for fast erection.

Case 76—Kentucky Foil Manufacturer

Packing Costs Cut with Wirebound Boxes

Packaging Procedures Simplified

Rolls of foil are slipped onto annealing racks. As soon as they emerge from annealing ovens, they are moved to the packing department. Removing the rolls from the racks presented the first major problem in Cochran's program to reform foil packing methods, but Cochran engineers perfected an ingenious hoist which permits a roll to be slipped from the rack with no danger of falling. Before it is removed, insulating material is placed over the end of the roll and a flange of one-inch wood is placed outside the material. Both the insulating material and wooden flange are previously prepared to fit over the core of the roll.

While one worker is removing the roll from the rack, another removes a one-piece wirebound "mat," which comprises the four sides of a shipping box, from a nearby pile and partly folds it into shape on a roller conveyor.

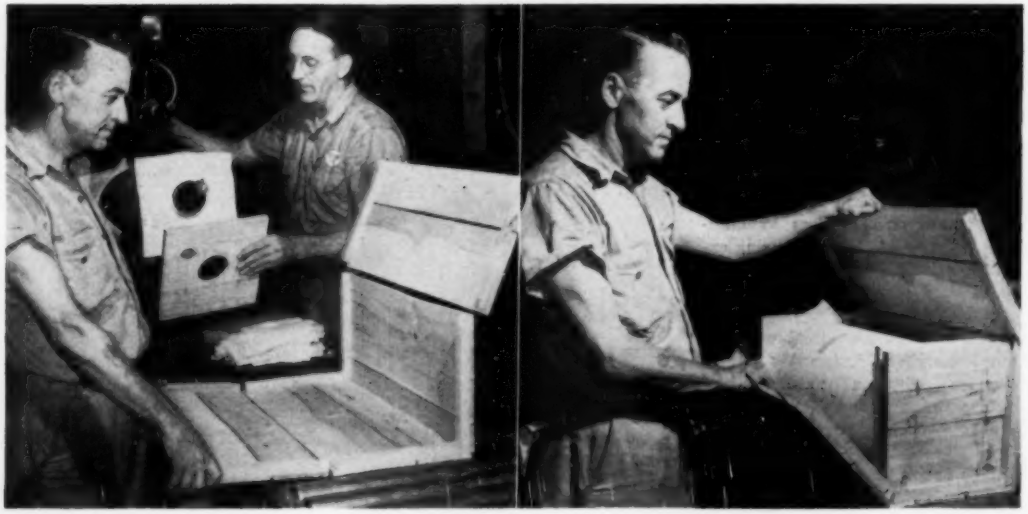
The packing procedure is so perfected that the hoist carrying the roll of foil from the rack reaches the packing station just as the wirebound box is prepared to receive it. Insulating material and a piece of pre-bored wood are slipped over the heretofore unprotected end of the roll and it is lowered onto the wirebound "mat" on the conveyor.

Packing room operation at the Cochran Foil Co., in Louisville, Ky., shows a worker removing a one-piece wirebound "mat" from a stack close to his packing station at a conveyor. The one-piece "mat" contains all four sides of the shipping container.

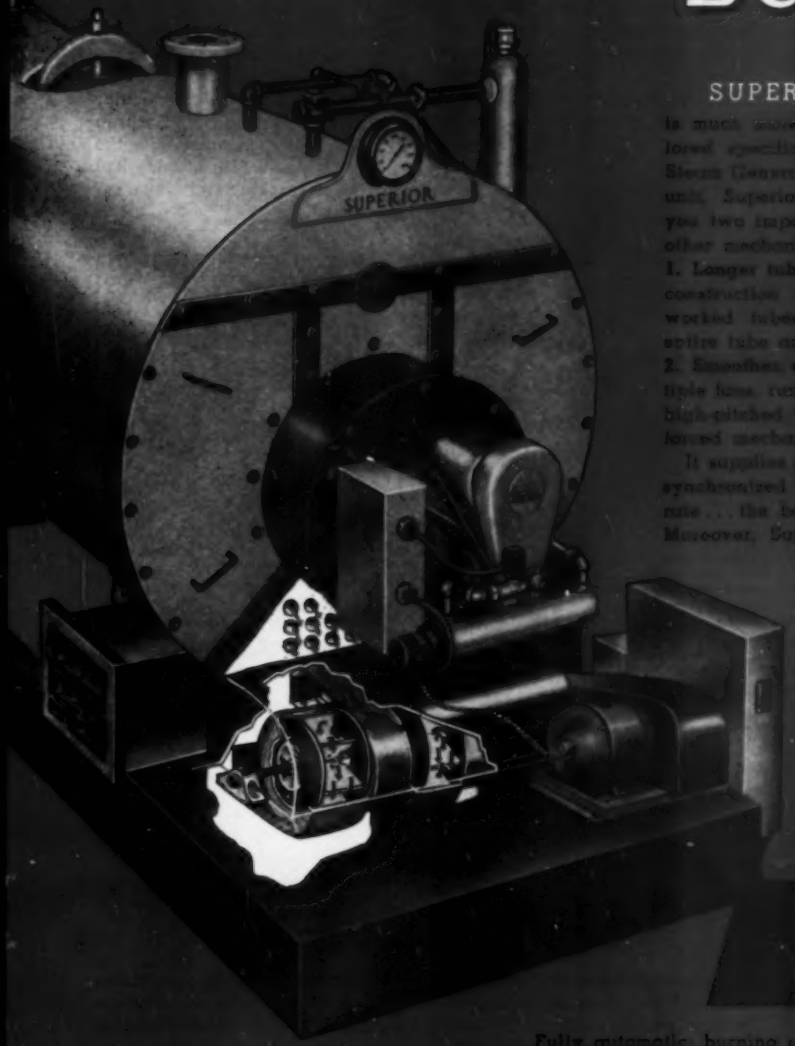
Box ends are then placed in position against the ends of the core of the roll and inside the cleats of the "mat." The other sections of the "mat" are folded into shape by literally being wrapped around both the ends and the special wooden interior packing and the box is closed by simply engaging and bending the wire-loop fasteners.

SOUTHERN packing ingenuity is directly responsible for solving the protection-during-shipment problems of the entire aluminum foil industry at impressive savings in costs. Packing tech-

While worker in foreground partly preforms a wirebound box on the roller conveyor, man in the background slips protective insulating material and a pre-bored wooden flange over the ends of the core of the roll of aluminum foil. Other end of the roll was thus prepared before it was lifted from the rack by special hoist device perfected by the Cochran Foil Co. Wirebound box is closed simply by folding it into shape so it wraps around the box ends.



BETTER *because it's* BUILT-IN



SUPERIOR'S INDUCED DRAFT

is much more than accessory equipment. Tailored specifically to its function in Superior Steam Generators, and built-in as an integrated unit, Superior's Induced Draft System offers you two important advantages not common to other mechanical-draft boilers.

1. Longer tube life . . . because full-width fan construction minimizes the danger of overworked tubes by its even draw across the entire tube area.

2. Smoother, quieter operation . . . because multiple fans running at low speeds eliminate the high-pitched whine commonly associated with forced mechanical draft.

It supplies air in precisely measured volume synchronized with the oil flow at every firing rate . . . the basis of high operating efficiency. Moreover, Superior's Induced Draft eliminates the possibility of forcing combustion gases into the boiler room.

These, in themselves, are very substantial reasons for specifying Superior Steam Generators, but for the whole story, write for Catalog 211.

STEAM GENERATORS

Fully automatic burning gas or oil, or both.
80% thermal efficiency guaranteed.
18 sizes from 20 to 200 h.h.p. for pressures up to 250 p.s.i.

uperior ombustion ndustries, inc.

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niques first perfected at the Cochran Foil Co., Louisville, Ky., are now used throughout that industry.

Packing foil is a delicate process. It is rolled to thicknesses down to .00025 inch (one four-thousands of an inch) and so is highly susceptible to damage by marking, tearing, or fraying at the ends when rolled.

Until Cochran Foil Co. and wirebound shipping container engineers developed the present method of packing for shipment, rolls of foil were packed in costlier, heavy boxes.

Now, protective insulating material is placed only over the ends of each roll and it is packed so it is suspended in its relatively light weight and less costly wirebound container without touching the sides in any place.

This is the technique perfected at the Cochran Foil Co. and now practically standard throughout the foil industry, even to use of special equipment developed by the Cochran firm. Besides bringing complete protection to the foil during shipment, the technique also has slashed packing costs drastically and speeded the packing process.

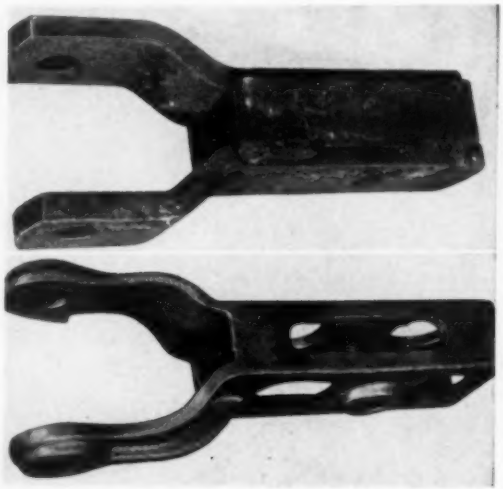
At the time of its conversion from using its own heavy boxes to the use of wirebound boxes, Cochran Foil Co. officials computed an over-all reduction of 50 per cent in aluminum foil packing costs.

The simplicity of the shock-resistant wirebound box also brought about other efficiencies. Each container consists of only five parts, which permits ample supplies of "mats," box ends, and pre-bored interior packing of various sizes to be stacked in a minimum of floor space close to the packing area.

At the same time it slashed packing costs so drastically, the conversion to wirebound boxes resulted in a much desired stronger and lighter box. So spectacular was the success of the Cochran Foil Co. that soon practically the entire aluminum foil industry had adopted its packing technique.

Case 77—Tennessee

Improved Product Design Pays Off



This part, comparatively small, was a top link unit for an equipment universal joint. Originally it was produced by welding together two hinge arms—sheared from ½ by 21/16-in. plate, drilled and formed—and two side members, from ⅜ by 1¼-in. stock. Thus fabricated (see top view), the part failed to satisfy the manufacturer's considered needs in terms of cost, weight and appearance.

Subsequent engineering collaboration led to agreement on redesign and conversion to a foundry-engineered steel casting meeting all of the requirements, providing greater service dependability, and complete customer satisfaction. As produced by Ross-Meehan, the cast steel top link conversion (see lower view) resulted in definite improvement in three tangible ways: 57 per cent weight reduction (7 lb to 3 lb), 6 per cent lower cost, and greatly improved appearance—an important sales consideration, since the part was completely exposed on the top of the implement in actual installation.

CONSULTATION between design engineers and foundry engineers is effecting many manufacturing advances measurable in dollar-and-cents gains in the steel casting industry and for the hundred or more important industries which it supplies.

Representative of industrial trends in the South and Southwest, this intensification of product development activities based on realistic engineering teamwork is paying off in numerous steel foundries, with mutual benefits accruing to both buyer and supplier. More economical production, improved products, greater dependability and other tangible gains result; and among these, none perhaps is more important momentarily than the factor of metals conservation frequently growing out of the emphasis on engineering design and re-design of costly or intricate parts.

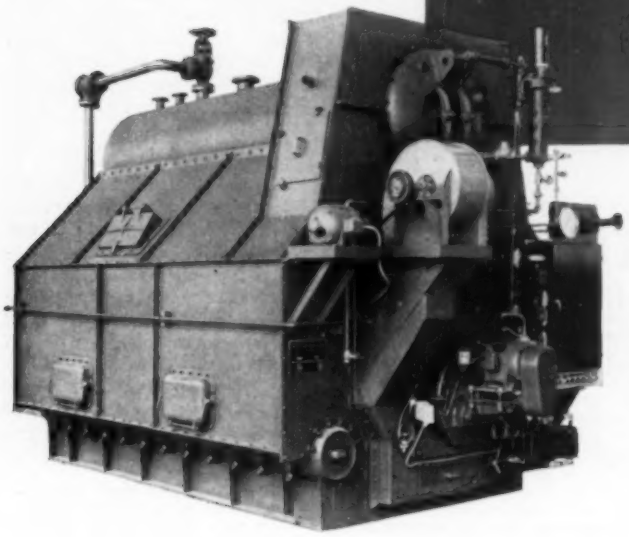
Typical proponent of such advanced engineering - production methods is Ross-Meehan Foundries, Chattanooga, Tenn., where recognition of the paramount importance of correct design has become a guiding force in achievement of lower costs, reduced weight and better appearance of parts, improved castability, and other advantages possible in engineered structures which still embody the necessary characteristics of quality, utility and essential strength.

How insistence on the engineering approach spells consistent progress is demonstrated graphically in the illustrated example from the Ross-Meehan production files. It is the foundries' solution of a problem encountered in the production of a satisfactory farm implement component required by a Southern manufacturer.

WICKES

shop assembled power

FOR YOUR STEAM GENERATING NEEDS



Steam power in a compact, efficient shop-assembled unit, custom-engineered to your exact steam generating requirements, ready for immediate installation! Wickes Type A Steam Generator is a steel-encased unit complete with baffles, refractories, pressure parts and firing equipment, designed to conserve headroom and floor space. Each furnace wall is a separate steam generator as well as an integral part of the boiler. There are no complicated headers or circulating tubes to require frequent maintenance or repair. Wickes Type A shop-assembled boilers are engineered for pressures up to 900 psi. with sustained steam production up to 35,000 lbs. per hour at 20 to 330 nominal h.p.

Wickes can also fill your requirements for steam generators up to 250,000 lbs. per hour and 950 psi. — all types of multiple drum boilers adaptable to any standard method of firing, oil, gas, single retort underfeed or spreader stoker. Write today for descriptive literature on Wickes complete line of steam generating equipment or consult your nearest Wickes representative.

WICKES

THE WICKES BOILER COMPANY

DIVISION OF THE WICKES CORPORATION

SAGINAW, MICHIGAN

135

RECOGNIZED QUALITY SINCE 1854 • SALES OFFICES: • Atlanta • Boston • Chicago • Cincinnati • Denver • Detroit • Houston • Indianapolis • Los Angeles • Milwaukee • New York City • Pittsburgh • Saginaw • San Francisco • San Jose • Springfield • Seattle • St. Louis • Tulsa • Mexico City • Buenos Aires • Manila • Havana • Montevideo • San Juan, P. R. • Victoria, B. C.

THE NORTHERN PACIFIC TRANSPORT COMPANY

. . . a very prominent western transportation company, operates a large number of motorized vehicles in the states of Montana and Washington. The operation of their equipment is extremely severe due to mountain grades and wide temperature variations.

They say . . . "THIS LUBRICANT CUT OUR PARTS REPLACEMENT 50%"

Quoting from their letter of October 17, 1949:

"We ran our first test on LUBRIPLATE #22 in March, 1945, in 3000 series Timken tandem-drive, worm axles. That year we experienced considerable trouble with wartime drivers and very poor roads, causing us no end of trouble. The oil that we were using set up to tar in 10 to 15 thousand miles. The LUBRIPLATE #22 proved so satisfactory we installed it in all our worm-gear, hypoid, and two speed axles. This enabled us to change our oil-change period from 15,000 miles to 40,000 and on some applications, depending on speeds and temperatures encountered, we raised the change period to 60,000 miles, or approximately once a year. Our overhaul periods were stretched from 50,000 to 100,000 miles, and repair parts bill cut 50% with the increased mileage."

Naturally with the economies that this company enjoyed through the use of LUBRIPLATE Lubricants on worm-axles, they extended the use of LUBRIPLATE to other parts of their equipment. The savings in parts, time, money and increased efficiency are equally startling. Let us send you the entire report of where they are now using LUBRIPLATE and what it is saving them.

LUBRIPLATE Lubricants will prove just as effective for you in your plant in reducing friction and wear. They are different from any other lubricants you have ever used. They save power, prevent rust and corrosion and definitely arrest progressive wear.

LUBRIPLATE Lubricants are available from the lightest fluids to the heaviest density greases. There is a LUBRIPLATE Product best for your every lubrication requirement. Let us send you CASE HISTORIES of savings that others in your industry are making through the use of LUBRIPLATE Lubricants. Write today.

LUBRIPLATE DIVISION
Fiske Brothers Refining Company
Newark 5, N. J. Toledo 5, Ohio

DEALERS EVERYWHERE . . . CONSULT YOUR CLASSIFIED TELEPHONE BOOK

LUBRIPLATE THE MODERN LUBRICANT

Case 78—N. Carolina

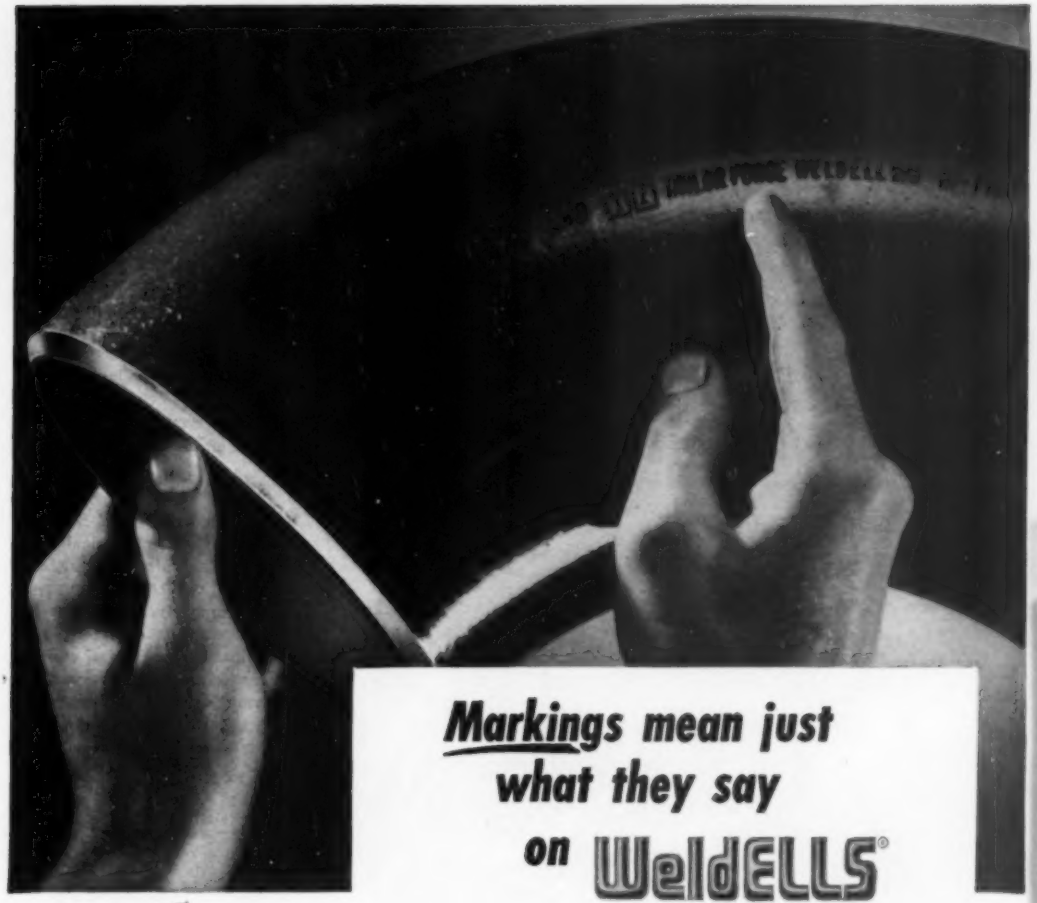
How to Streamline Order Processing

SOUTHERN and Southwestern plants desiring streamlined order processing may note the methods applied to the Melrose Hosiery Mills, High Point, N. C. New procedures were a direct result of a survey of the company's order system by the Management Engineering Service of Remington Rand Inc. Analysis of the flow of goods throughout the mills and investigation of filing systems and record handling methods enabled bottlenecks to be located and examined. The management engineers were then able to recommend exactly the needed improvements.

Perpetual Inventory

The objective of the Melrose Mills was a balanced perpetual inventory allowing orders to be met promptly and definite stock information to be available for salesmen. Previous inventories had been based on traditional calculations of stock on hand by dozens and broken dozens, which often proved to be inaccurate. This led to a lack of detail which threw off records and allowed particular types of stock to

A large Remington Rand Sched-U-Graph installation similar to the procedure used by the Melrose Hosiery Mills of High Point, N. C.



Markings mean just what they say on WeldELLS®

A VOLUME OF USEFUL DATA ON A SINGLE SHEET—Sizes, thicknesses and dimensions of all commonly used WeldELLS and Taylor Forged Steel Flanges ingeniously condensed on a heavy durable, letter-sized card. Indispensable for piping men. Coupon brings free copy.

No other fittings for pipe welding are so true to their markings as WeldELLS — so absolutely uniform, mechanically, metallurgically, dimensionally.

It would be bad business for us to say this if thousands of users had not already said it for us and to us. "There are no bad ones" is nearly always the foremost reason given by practical men for insisting on WeldELLS.

Pick up any WeldELL and check it against the tabulation of its size, wall thickness, and other dimensions. It will be right on the head. And it will be right on the head in plus-value features, too—features that are combined in no other fittings.

Remember that the finest line of welding fittings *is* also the broadest line. Coupon brings your copy of useful data described below.

TF

TAYLOR FORGE

TAYLOR FORGE & PIPE WORKS

General Offices and Works: P. O. Box 485, Chicago 90, Ill.
Offices in all principal cities
Plants at: Carnegie, Pa.; Fontana, Calif.; Hamilton, Ont., Canada

Please send a copy of your data sheet covering Taylor Forge Welding Fittings and Forged Steel Flanges.

NAME_____

POSITION_____

COMPANY_____

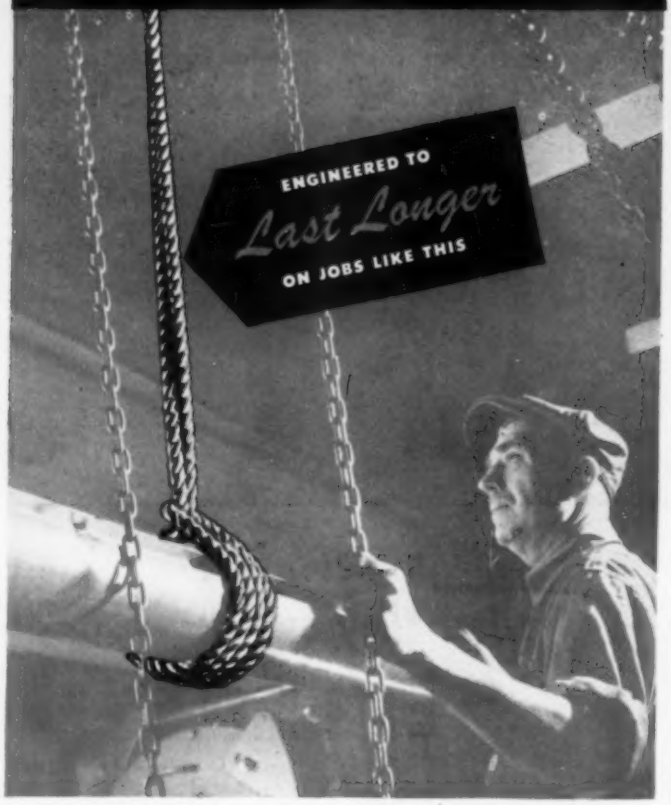
STREET ADDRESS_____

CITY_____ ZONE____ STATE_____

758-1051 Mail to Taylor Forge & Pipe Works, P. O. Box 485, Chicago 90, Ill.

For Highest Rope Strength

PLYMOUTH SHIP BRAND MANILA



THE HIGHER your rope's tensile strength, the safer your workmen and the things they handle. The true tensile strength of Plymouth SHIP BRAND Manila rope is as much as 25% more than shown in published "minimums". It's your best long-term insurance against accidents, especially when ropes are suddenly strained beyond their normal safety factor. Play safe next time and specify Plymouth SHIP BRAND Manila—your best rope buy at *any* price. Return coupon for helpful data.

PLYMOUTH
Cordage Products

PLYMOUTH CORDAGE COMPANY
381 Court St., Plymouth, Massachusetts
Send informative booklets and charts to help get more life from my ropes.
Name _____
Company _____
Address _____

ROPE AND TYING TWINE FOR INDUSTRY

pile up in one place when they were needed in another.

The first proposal was that stockings should be counted by pairs, thereby allowing quicker and easier calculations than had been possible under the old system of estimating by whole or partial dozens. After this accent-on-accuracy foundation, revision of the accounting system included installation of visible Kardex sales records and a Sched-U-Graph board, as well as an IVI Master Sales Record. Shipping procedures were revamped and product styles were recoded. New purchasing record, production planning and order processing procedures were developed to accomplish the objectives of the mills.

Benefits

Through present use of the new procedures, errors are quickly detected and eliminated. Faster and more efficient service has been made possible through constant use of up-to-date records and modern methods, and usable data of market research value is readily available. An automatic perpetual inventory gives fact power to both management and labor, thereby increasing sales.

Case 79—Georgia

Faster Machining

IN a southern railroad shop car axles were being machined on a center drive axle lathe with HSS tools at 72 rpm and a feed of .036 in. The finish was poor and considerable time had to be spent on burnishing. One operator machined 7 axles per 8-hour day, and tools had to be resharpened after turning only 2 axles.

When the lathe was equipped with Kennametal brazed tools, Grade K4H, and speed increased to 200 rpm, two operators, one at each tool carriage, were able to machine 20 axles per 8-hour day. Less burnishing was required because of the smoother turned finish. Tools had to be reground only once during the 8-hour shift.

Kennametal cemented carbide products are produced by Kennametal Inc., Latrobe, Penna.

It's not how *many*... but how *many kinds*!

We are making no claims as to how many Powell Valves are in use today. But we do claim that the countless Powell Valves now serving industry are in a far greater *variety* of designs and materials than you'll find in any other individual make.

In other words our chief interest is in meeting *all* the complex flow control requirements of modern industry rather than in mass production. Think it over!

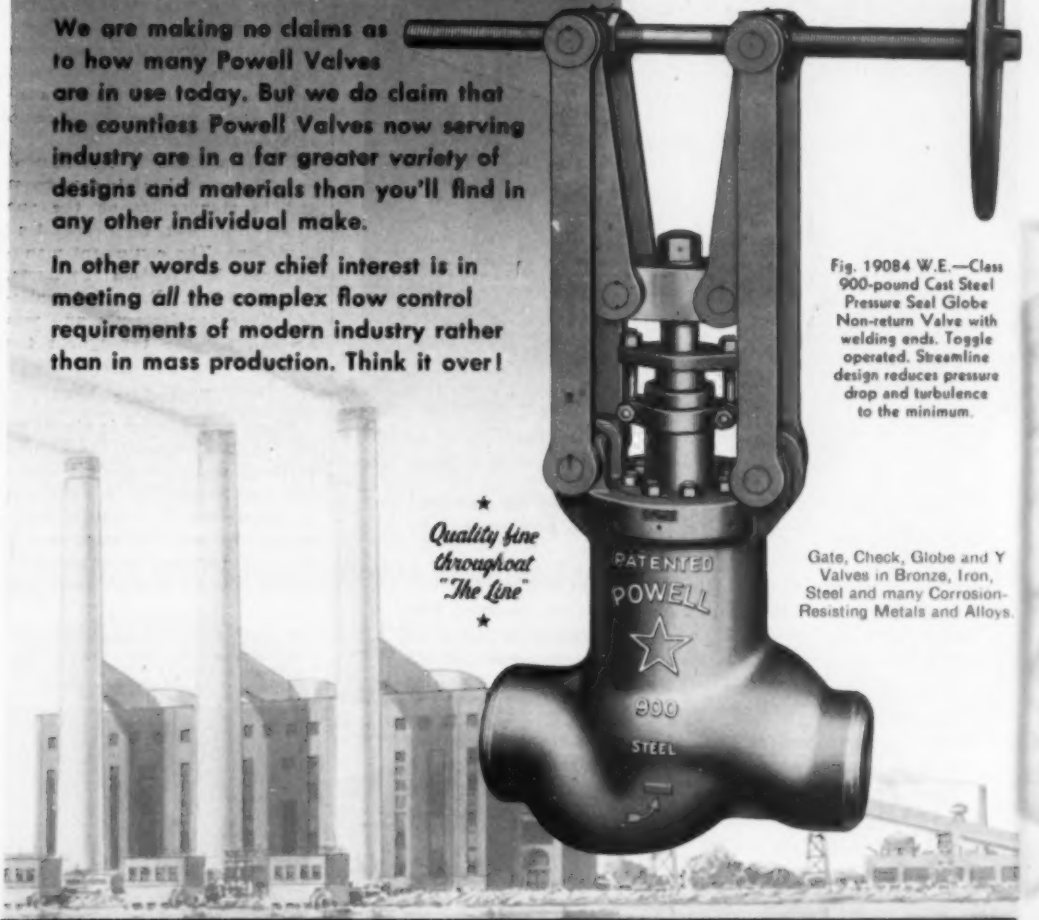


Fig. 19084 W.E.—Class 900-pound Cast Steel Pressure Seal Globe Non-return Valve with welding ends. Toggle operated. Streamline design reduces pressure drop and turbulence to the minimum.

★ *Quality line throughout "The Line"* ★

Gate, Check, Globe and Y Valves in Bronze, Iron, Steel and many Corrosion-Resisting Metals and Alloys.

POWELL

The WM. POWELL CO., 2525 Spring Grove Ave., P. O. Box 106, Station B, Cincinnati 22, Ohio

Speed Reducer Selection *Made Easy!*

When speed reduction requirements are within the fractional through 85 hp range, there is no selection problem for the design, consulting or plant engineer.

He *knows* that Winsmith can meet his specifications *precisely* with the world's most complete line within this category. And even more important, he *knows* that recommendations from Winsmith's engineering representatives can always be counted on to be practical and unbiased. That's only natural with so large a variety of standard units to choose from.

As one-of-a-kind replacements in the plant, or in quantities to serve as components on new machines, standard Winsmith Speed Reducers are a certain solution where ratings must be within the range of: 1/10 to 85 hp, 1.1: 1 to 50,000 : 1 ratio and 32 to 113,000 in. lbs. max. output torque.

50th Anniversary

Fully descriptive literature, which includes suggestions for simplifying and expediting selection, will be mailed at your request.

MEMBER OF AGMA

WINSMITH SPEED REDUCERS

WINSMITH, Inc.

Case 80—Tennessee

Industrial Injuries Affect Production

THE Chattanooga Division of Combustion Engineering-Superheater, Inc., manufacturers of steam generating and fuel burning equipment, was faced with the problem of increasing their production. A careful study of all the factors involved led to the conclusion that in order for production to be maintained at peak efficiency, they must reduce lost-time accidents and occupational disease to an absolute minimum.

It was decided to test several lines of personal safety equipment and to standardize on the one which best met their operating conditions. The equipment manufactured by Willson Products, Inc., Reading, Pa., best satisfied their requirements and was adopted for use throughout the plant.

Procedure

When an employee is placed on his job, he is issued the correct personal equipment for the operation and thoroughly instructed in its proper use. This instills in the worker an ease of mind and a sense of personal security which enable him to produce more effi-

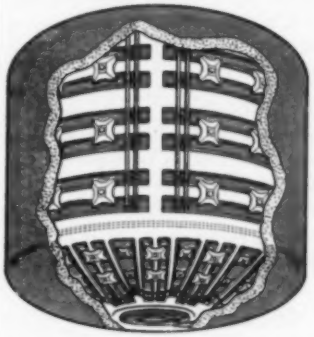
Welder using the Willson Flip Front Welding Helmet. This helmet has reduced eye injuries from hot slag 20 per cent in the Chattanooga plant.

Industry's Most Versatile Heat Source

Chromalox *Electric* Strip Heaters

Easy to Install CHROMALOX Electric Strip Heaters give clean, dependable and accurately controlled heat where and when heat is needed. They produce uniform and accurate temperatures by automatic or manual controls. Low initial costs, low installation costs and low operating costs are among the many advantages of using CHROMALOX Strip Heaters for heating liquids, gases, viscous fluids, tanks, platens, molds, moving parts, etc. Get the full details now.

A Typical Strip Heater Application from Our Files



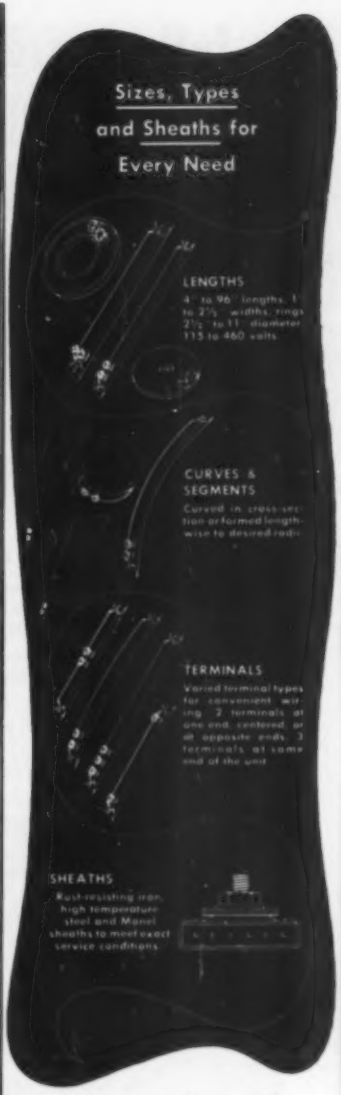
Rugged, easily installed Chromalox Strip Heaters assure accurate temperature, dependable around-the-clock service.

Strip Heaters curved slightly as installed conform to shape of convex kettle bottom, while...

Strip Heaters curved lengthwise at the factory fit snugly to tank perimeter and...

Segment Heaters fill the gaps.

IC-99


Sizes, Types
and Sheaths for
Every Need
LENGTHS
4" to 96" lengths, ½" to 2½" widths, rings 2½" to 11" diameter, 115 to 460 volts
CURVES & SEGMENTS
Curved in cross-section or formed lengthwise to desired radii
TERMINALS
Varied terminal types for convenient wiring. 2 terminals at one end, centered, or at opposite ends. 3 terminals at same end of the unit
SHEATHS
Rust-resisting iron, high temperature steel and Monel sheaths to meet exact service conditions

Want Ideas?

on how to use Chromalox Electric Heaters in your plant

Write for the data-packed Catalog 50 which describes many types of Chromalox Electric Heaters and how to apply them. It's yours without obligation.

CHROMALOX

Electric Heat for Modern Industry

EDWIN L. WIEGAND COMPANY
7563 Thomas Blvd., Pittsburgh 8, Pa.

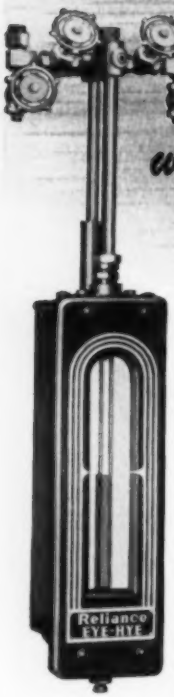
C. B. Rogers, 1000 Peachtree St., N. E., **Atlanta, Ga.**; L. B. Ward Co., 2711 Commerce St., **Dallas 1, Texas**; 922 M & M Bldg., **Houston 2, Texas**; 1511 Louisiana St., **New Orleans 15, La.**; 1519 S. Boston St., **Tulsa 3, Okla.**; W. B. Phillips, P. O. Box 2561, **Raleigh, N. C.**; W. B. Phillips, Jr., 3125 Lamb Ave., **Richmond 22, Va.**

For full assurance of safe, accurate boiler water level reading

wherever you want it...

RELIANCE

Remote Reading **EYE-HYE**



Why it pays you to install EYE-HYE

Flexibility of Placement. Gage reading *precisely where* most convenient to see — even *above* the boiler, if power plant arrangement indicates.

Easy, *Natural* Reading. Indication by column of liquid like the familiar conventional boiler water gage.

Sharp Visibility. Eye-appealing green indicating fluid, illuminated to provide a sharp mistake-proof image.

Scientific Accuracy. Relies on the positive law of physics embodied in the U-tube manometer principle.

Simplicity. Smooth hydrostatic action—no mechanical working parts—no adjustments on location.

Safety. Invites frequent reading—an aid to preventing water level accidents.

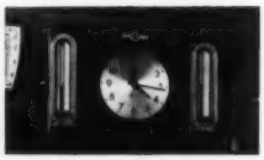
Easy Installation. Copper or steel tubing follows most convenient path from temperature equalizing unit at drum to desirable gage window location.

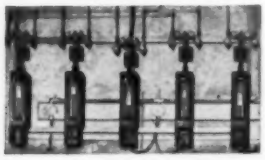
Low Maintenance. Scheduled cleaning only at infrequent intervals. Easy to blow down to insure clean lines.

Write for complete catalog information covering the many uses of EYE-HYE.

Besides the EYE-HYE Reliance makes a complete line of Water Columns, Water Gages and other trim for all working steam pressures.

THE RELIANCE GAUGE COLUMN COMPANY, 5902 Carnegie Ave. Cleveland 3, Ohio





The name that introduced safety water columns....in 1884

Reliance®

BOILER SAFETY DEVICES

Skilled tool grinders are hard to replace when off due to eye injuries. The Willson cup goggles save trips to first aid. Combustion Engineering-Superheater's tool room in Chattanooga has operated a number of years without a lost time eye injury.

ciently. Since this program was put into effect under the direction of Supervisor of Safety E. W. Reynolds, Combustion Engineering's accident experience has reflected a 60 per cent improvement and their records show clearly that personal safety devices have played a major part in this decrease.

Eye injuries in the welding department dropped 20 per cent after the Willson Flip-Front Helmet was put in use on this operation. Also, since the adoption of the Willson respirator approved for the specific contaminate on each job where dust, mist or vapor is a hazard, not one single case history of occupational respiratory disease has been recorded.

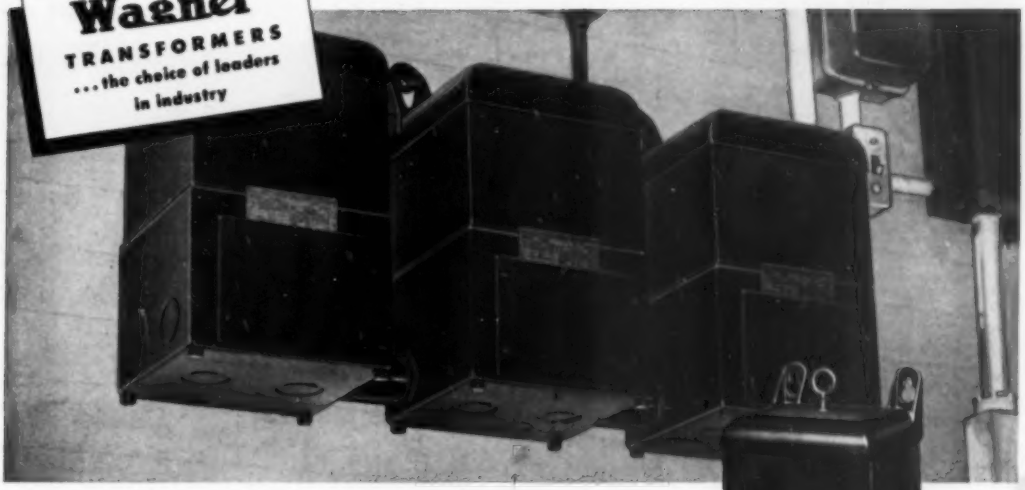
Better production through better protection is the by-word at Combustion Engineering, and it's paying dividends in improved employee relations as well as in improved production schedules.

Case 81—Oklahoma

Industrial Tape Serves Dual Purpose

BRASS bushings for oil well pumps are among the numerous items made by the Drilling Equipment Manufacturing Company of Oklahoma City, Oklahoma. These are supplied split through the diameter of the cylinders for

Wagner
TRANSFORMERS
...the choice of leaders in industry



Reduce Power Distribution Costs
(Save copper too!)
with Wagner Dry-Type Transformers

You can save money, save copper, and improve voltage regulation by bringing the *right* voltage to the load center with Wagner Dry-Type Transformers. They are safe to use—without fireproof vaults or other special protection—even where fire hazards are present. They provide steady voltage with minimum line losses. They are compact and light in weight—economical to install and easy to move when changes in plant facilities are necessary.

TYPE AE

Wagner Dry-Type Transformers are available in single-phase, two coil units (Type AE) in sizes 1.0 to 200 kva and in three-phase, two coil units (Type AP) in sizes 3.0 to 300 kva. Both types 600 volts and below.

These dry-type transformers can be used in many lighting and power applications. Bulletin TU-90 gives many suggestions that you can use—write for your copy or consult the nearest of Wagner's thirty-one branch offices for expert advice on your transformer problems.

TYPE AP

Wagner Electric Corporation
1891 1951

TU-90

WAGNER ELECTRIC CORPORATION
6383 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 31 PRINCIPAL CITIES

C. L. Knight of the Drilling Equipment Mfg. Co. of Oklahoma City, Oklahoma, applies Topflight Tape strip to bushing assembly.

ease of installation. The problem was to keep the matching halves of each bushing together and to identify the units with the "Demco" trademark.

About four years ago company officials tried using a length of printed Topflight Tape wrapped around the two pieces and found that it not only held them perfectly but also provided an attractive label. They have continued to use this method and have also extended the use of Topflight adhesive tape labels to other items even where there is no problem of holding parts together.

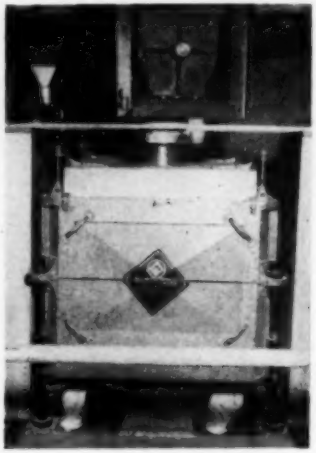
Case 82—Kentucky

Improved Cleaning

THE installation of an Allis-Chalmers Low-Head gyratory sifter at the Falls City Brewing Co., Louisville, Ky., for cleaning malted barley indicates a forward step in the preparation of grain in the brewery industry.

The Low-Head sifter has shown an improved yield over the conventional reel, requires less space and horsepower and has the advantage of lower maintenance cost.

Designed to promote sanitation, the sifter has a readily accessible interior, so that sieve frames and cloths can be easily inspected. According to Allis-Chalmers engineers, it is an established fact that cloth life on a gyratory sifter is longer than on a reel.



A-C Low-Head sifter installed in this Louisville brewery is self-contained and is operated by a 1 hp motor and Texrope drive mounted as a unit on a substantial structural steel base.

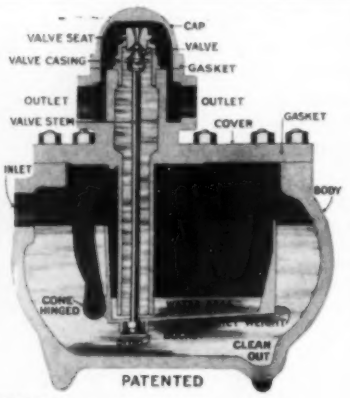
Case 83—Alabama

Alloy Substitution Improves Product

SOUTHEASTERN Tool & Die Company, Birmingham, Ala., is a leading producer of aluminum window and door screen frame sections. They desired an improved door frame product at a minimum additional cost. Increased strength of section and a pleasing appearance were the main prerequisites.

Engineers of the Kaiser Aluminum & Chemical Sales Co., Inc., recommended the replacement of the general purpose aluminum alloy, 3S, in use at that time, by Kaiser's new K-150 alloy. This alloy has provided Southeastern Tool & Die with a finished product which has a materially increased strength, thereby reducing looseness and twisting of the finished frames to a minimum. The surface appearance is also brighter. No changes in fabricating procedure were required.

ONLY ONE MOVING PART



PATENTED

in a Squires STEAM TRAP

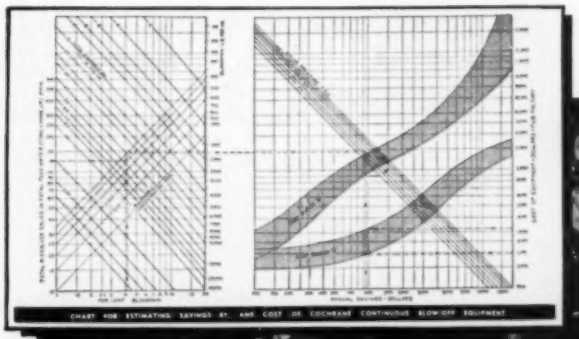
Over the long pull, Squires Steam Traps are the LEAST EXPENSIVE to own and operate. These are the reasons why: (1) There is only ONE moving part—the bucket hinge. (2) The larger capacity in both orifice and bucket mean fewer discharges, less wear. (3) You don't have to break main line connections to get at the valve and seat.

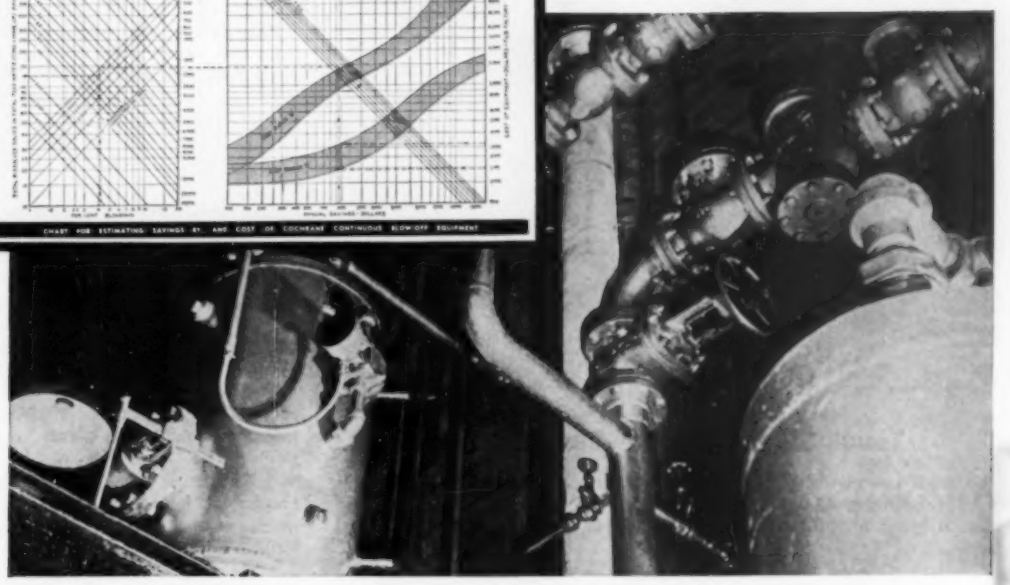
You can't beat Squires for economy of operation. It is one steam trap you can INSTALL and FORGET. Write today for complete details. Ask for Catalog No. 100. Write us concerning traps for testing purposes.

IN MANY INDUSTRIES FOR OVER 40 YEARS . . .
DEPENDABLE SQUIRES TRAPS ARE IN DAILY USE

Steel — Pulp & Paper — Meat Packing — Public Utilities — Steam Ship — Distilling — Food Processing — Textile — Oil — Chemical — and many others.

THE C. E. SQUIRES COMPANY
Over 50 Years of Dependability
18531 SYRACUSE AVE. — DEPT. B-1 — CLEVELAND 10, OHIO





COCHRANE CONTINUOUS BLOWOFF

If you are using old-fashioned methods of blowing down boilers intermittently, you can save heat, save fuel, save money, maintain uniform boiler concentrations—and *get your money back inside a year*—by installing a Cochrane Continuous Blowoff System.

The savings are due, first to heat recovery by utilization of steam flashed from the blowoff and by directing the hot waste water (remaining after flash) through a heat exchanger. Uniform boiler concentrations, another result, mean smoother boiling conditions, cleaner steam.

Chart shown above, for estimating savings is included in Publication 4410 a copy of which will be sent you.

SAVES HEAT
•
SAVES FUEL
•
SAVES MONEY

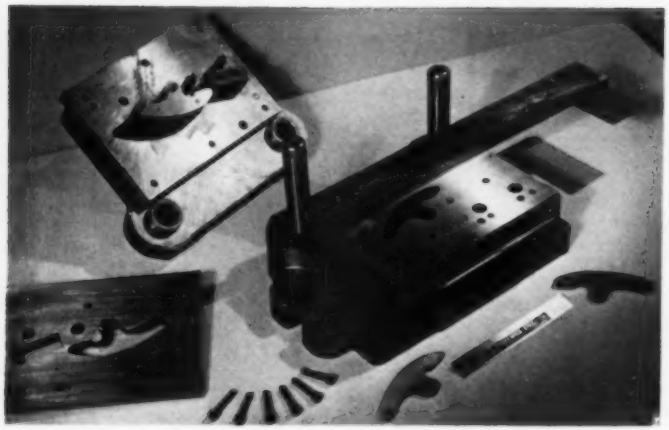
Cochrane Corporation
3110 N. 17th St., Philadelphia 32, Pa.

Please send me a copy of your Publication 4410, containing chart for figuring savings by Continuous Blowoff.

Name .....
Firm .....
Address .....
City ..... Zone ... State .....

COCHRANE CORPORATION 3110 N. 17th St., Phila. 32, Pa.
In Canada: Canadian General Electric Co., Ltd., Toronto
In Mexico: Babcock & Wilcox de Mexico, S.A., Mexico City • In Europe: Recuperation Thermique & Epuration, Paris

COCHRANE



Case 84—Texas Metalworking

Tough Steel for Tough Punching Job

A TOUGH non-deforming die steel has solved troublesome production problems in a Houston, Texas, metal stamping plant.

The job involved was a rocker arm of a metal mitre hand-operated die set, used principally on intricate work on stainless steel moldings, etc. The rocker arm is about 4 in. long and 1¾ in. high, and is roughly T-shaped, with two holes 9/32 in. and 7/32 in. in diameter.

Fabricating this complex part from cold rolled carbon steel was a problem until R.D.S., on oil-hardening steel made by The Carpenter Steel Co., Reading, Pa., was used for the punch and die. Now all working parts of the die, except guide rails and stripper, are made of this steel, resulting in high production records per die. And the punched holes are finished to very close tolerances and spacing, with shaving punches also made from R.D.S. These punches process up to 200-300 per cent more pieces than punches made of other steels.

The company has also used R.D.S. successfully in punching 15/64 in. holes from mild steel plates ¼ in thick. It is generally considered very difficult to punch holes having smaller diameters than the thickness of the plate being punched, but R.D.S. does the job successfully.

Case 85—Southern Pulp and Paper

Fan-Pump Installation Meets Severe Process Variables

THE past few years have witnessed great expansion in the pulp and paper industry, particularly in the South and Southeast. This expansion has introduced problems requiring new and better equipment and techniques. One problem is the new large high speed paper machines, equipped to operate at wide variations in speed and weight of paper. This calls for supplying stock to the paper machine at greatly different capacities and pressures.

Obtaining accurate pressure is particularly important since this pressure determines the velocity of the stock flowing from the inlet or head box through the slice and onto the rapidly moving paper machine wire screen. The slice is an adjustable slot the full width of the paper machine wire through which the stock spouts and then falls on the wire. If, for example, the paper machine wire is moving at 1000 fpm, then the velocity of stock flowing from the slice should also be 1000 fpm. This velocity is determined by the pressure or head of the stock on the inlet side of the slice. At about 1000 fpm a variation in the pressure or head of one inch of water results in a variation of about 10 fpm in velocity through the slice.

The problem then becomes one of controlling the capacity of the fan pump which supplies the stock to the head box and controlling the pressure or elevation of the stock in the head box to give the required velocity through the slice. The most common procedure for accomplishing this is to throttle the discharge of the fan pump in order to control the capacity and by using baffles and weirs to adjust the height of stock in the head box to get the correct velocity in the slice.

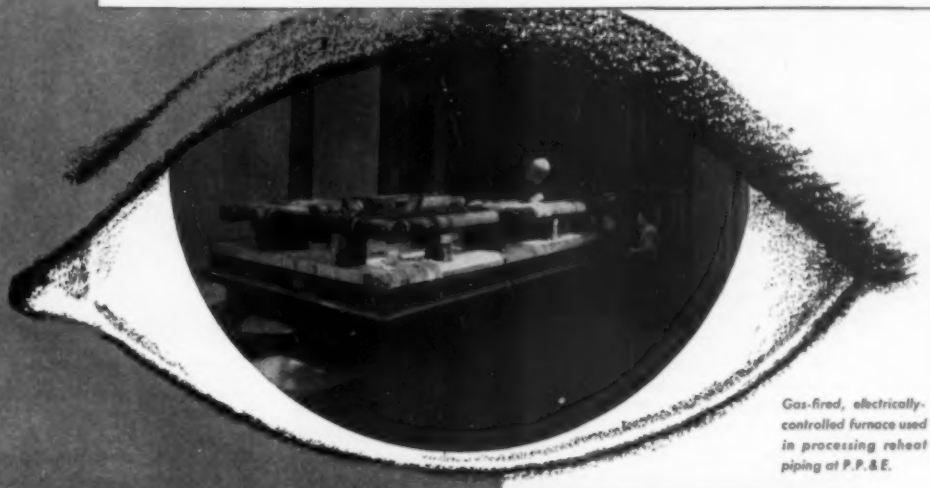
Severe Variables

Where the variation in capacity and velocities is not too great this system is quite satisfactory. However, where there is wide variation in both of these factors and where uniformity of the paper produced at any condition is important then more accurate and easier controls are indicated.

This problem arose in connection with the new paper machines for the expansion of the Hollingsworth and Whitney Company Mill in Mobile, Alabama. With wide variations in paper machine speed and weight of paper the fan pump would be required to operate at capacities from 18,000 gpm down to about 2600 gpm with corresponding changes in pressure in order to suit the velocity of the paper machine.

The driver is an electric machinery 300 hp 720 rpm synchronous motor with 80 per cent power factor. This motor drives an electric machinery size 44 magnetic drive. This magnetic drive transmits the torque electro-magnetically from the constant speed of the synchronous motor to the precise speed desired for the driven machine. The fan pump is a Worthington 20 LA2 pump constructed of all bronze to withstand

Looking at REHEAT



Gas-fired, electrically-controlled furnace used in processing reheat piping at P.P.&E.

Through Experienced Eyes

Proper piping is essential in order to realize the benefits inherent in reheating steam to higher temperatures—increased volume per pound of water evaporated . . . reduced condensation in lines, casings, cylinders, etc. . . . improved BTU output . . . better fuel economy.

Remember when 750° F. was thought to be a high reheat temperature? Even then P.P.&E. was ahead of the needs in piping that would carry the load. As the trend toward higher temperatures continued, P.P.&E.'s experience accumulated.

That's why the conditions encountered in present-day reheat temperatures over 1000° F. are thoroughly understood by P. P. & E. engineers—and why adequate materials, design know-how, methods of treating and fabricating, and testing procedures are available.

Look to Pittsburgh Piping and Equipment Company for the experience, and the leadership in methods that assure greatest safety, highest efficiency, and longest service from high temperature, high pressure piping.

P. P. & E. Products

Carbon Steel Piping	Forged Piping Materials
Cast Iron Fittings	Headers
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Chrome-Moly Piping	Pipe Bends
Copper Piping	Stainless Steel Piping
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Expansion Bends	Welding Fittings
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the corrosive effects of the acidity of the stock handled. This pump has a maximum rating of 18,000 gpm at 50 feet head when driven at 700 rpm.

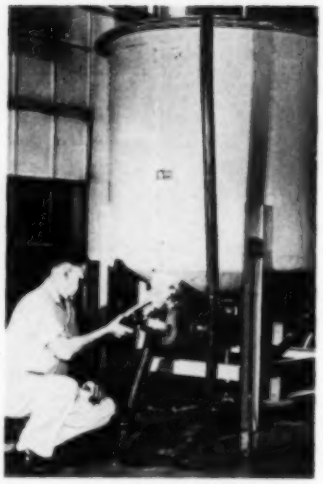
Suitable controls are furnished so that the slip between the synchronous motor speed and the desired pump speed can be regulated by the paper machine operator while at the paper machine so that he can observe at all times and make any corrections necessary to insure exactly the correct output from the fan pump. The accuracy of this equipment is such that the speed of the fan pump can be regulated to less than $\frac{1}{2}$ of 1 per cent and in fact in actual operation speed variation has been held to within 0.1 to 0.2 per cent. Furthermore, when more accurate speed control is required this also can be provided. The sensitivity of this speed regulation is such that exactly correct flows to the wire are assured for all speeds of the paper machine. The smoothness of the speed variation is such that no sudden changes in stock velocity occur to cause entrainment of air bubbles and consequent foaming of the stock as it hits the wire.

A further advantage in this setup is that only the power required to pump the necessary capacity and head is used and no power is used in throttling or by-passing excess capacity and head. Since the usual fan pump is sized for maximum capacity plus a safety factor and operated considerably below this design figure, the power saving should become quite considerable. Then too, the power factor correction of the synchronous motor is most desirable.

Case 86—Maryland

Rubber Lined Tanks Eliminate Leakage

ONE large Baltimore food processing plant mixes mustard for a week in 500 gallon tanks until it passes a test for taste and smoothness. The plant used wooden tanks held together by metal bands. The bands were rather rapidiy corroded by vinegar, causing joints in the tank to become loose, resulting in considerable leakage.



500 gallon metal tanks lined with B. F. Goodrich Super Flexite replaced wooden units held together by metal bands in this Baltimore food processing plant.

The company solved the problem by installing 500 gallon metal tanks lined with B. F. Goodrich Super Flexite. The rubber lining not only protects the metal tank from corrosive vinegar and mustard, but offers a much higher degree of sanitation.

Case 87—Maryland

Aluminum Mill Adds Equipment

REVERE Copper and Brass Incorporated recently made several changes and additions at its rolling mill in Baltimore, Maryland, which will enable the company to offer its customers a wider range of widths and gauges in 2S and 3S aluminum coiled sheet.

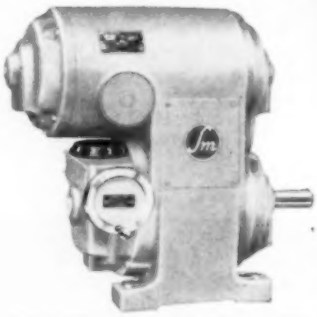
Improvements supplement equipment already employed in the manufacture of aluminum coiled sheet and increase the plant's capacity by several million pounds annually.

One of the important additions to the plant facilities is a modern high speed 4-High rolling mill for the finishing of aluminum coiled sheet. This new mill replaces a 2-High mill and has the advantages of rolling material in wider widths,

power modernization

lowers production costs...

with control of speed



STERLING SPEED-TROL

. . . Gives You Variable Speed Control Necessary For:

- **PROCESS CONTROL OF:** Temperature—viscosity—level—pressure—flow—etc.
- **TIME CONTROL OF:** Baking—drying—heating—cooking—pasteurizing—soaking—chemical action—etc.
- **EQUIPMENT ADAPTATION TO:** Load variation—sequence synchronization. Size—tension—hardness or shape of materials to be processed—machined—conveyed—blended—mixed—etc.
- **VARIATIONS IN:** Quality—quantity—operators' abilities—etc.

Ask for your copy of pictorial bulletin No. B-74 showing Sterling Electric Power Drives Turning The Wheels of Industry.

STERLING ELECTRIC MOTORS

Plants: New York 51, N. Y.; Los Angeles 22, California; Hamilton, Canada; Santiago, Chile. Offices and distributors in all principal cities.

at higher speeds, and with greater accuracy of gauge control. The unit is powered with a 1500 hp, d-c motor giving mill operating speeds in excess of 1000 fpm.

Modern slitting equipment has also been installed in the plant. These machines provide the means of producing a wide range of widths of coiled sheet with accurate width and camber control.

Case 88—Texas

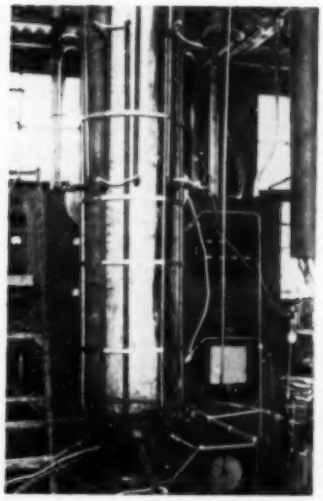
Electric Heat

QUICK heatup, exact process heat and easily duplicated temperatures up to 1100 F are easily obtained with electric heat in a pilot catalytic cracker at a major Texas oil company.

Mounted on the surface of the cracking vessel are a number of evenly spaced Chromalox alloy-sheathed tubular heaters, with triangular cross-section that provides a flat, contact surface for better heat conduction. Stainless steel bands hold the heaters in position.

The heaters vary in length and are curved to fit contours at the top and bottom of the vessel. Installation was quickly and easily accomplished. Service, if ever required, will be equally simple.

Chromalox tubular heater of the Edwin L. Wiegand Company installed at a major Texas oil company. Insulation not yet applied.



WHICH PIPE NEEDS FOAMGLAS MOST?

● As these fuel oil and steam lines at the Warners, N. J. plant of American Cyanamid Company must be kept at temperatures of 190° to 390° Fahrenheit, they *all* have a big need for their factory-wrapped FOAMGLAS.

FOAMGLAS — indoors or outdoors — insulates equally well from below zero temperatures to 800°F. It retains its effectiveness. It's light, rigid, durable.

For use on pipe lines of standard sizes, FOAMGLAS is available in two types, "Regular" and "Factory-wrapped." The latter—covered with a glass cloth membrane—is most widely used for temperatures from 212°F. to 800°F., but also can be used for cold applications.

Get the latest information about FOAMGLAS for piping, valves and fittings, tanks and towers, heat exchangers, evaporators and other process equipment. Write for sample and free copy of booklet.

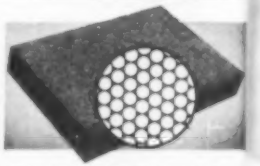
Factory-wrapped pipe insulation comes with a ready-made finish that may be painted if desired. The FOAMGLAS sections are placed on the pipe, wired or banded, and the flaps then cemented over the longitudinal and end joints respectively. Piping and fitting insulation is fabricated to close tolerances to insure close fit with the equipment and to provide full thickness of insulation.

PITTSBURGH CORNING CORPORATION
PITTSBURGH 22, PA.

PITTSBURGH PC CORNING

FOAMGLAS®

the cellular glass insulation



The best glass insulation is cellular glass. The only cellular glass insulation is FOAMGLAS. This unique material is composed of still air, sealed in minute glass cells. It is light weight, incombustible, vermin-proof. It has unusually high resistance to moisture, chemicals and many other elements that cause insulation to deteriorate.

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Please send me without obligation, a sample of FOAMGLAS and your FREE booklet on the use of FOAMGLAS for Piping and Process Equipment.

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WHEN YOU INSULATE WITH FOAMGLAS . . . THE INSULATION LASTS!

News for the South and Southwest

Westinghouse Electric's Power Distribution Traveling Exhibit to Visit Southeast in Oct.

Emphasizing the importance of properly applied electrical equipment for increased production, a traveling industrial power exhibit is being sponsored by WESTINGHOUSE ELECTRIC CORPORATION and its distributors. The exhibit, called "More Production Ahead," now is on a tour of industrial centers in the South and Southwest as a part of a planned power distribution program.

According to J. L. Wagoner, exhibit lecturer, "enormous supplies of power are needed for increased production. When planning any type of power distribution system, careful consideration must be given to all power requirements for best operating efficiency consistent with cost. To meet increased production requirements, it is important to take every advantage of existing plant equipment to make it perform more flexibly, to make it last longer, and to apply skillfully what new equipment is available."

Uses Model Factory

Using a three-dimensional model factory, Mr. Wagoner "lays out" a modern power distribution system. Playing the role of the model factory's plant engineer, he analyzes power loads, as well as demand and diversity factors. He finally decides that a 2000-amp service is ample to meet the plant's present and anticipated power requirements.

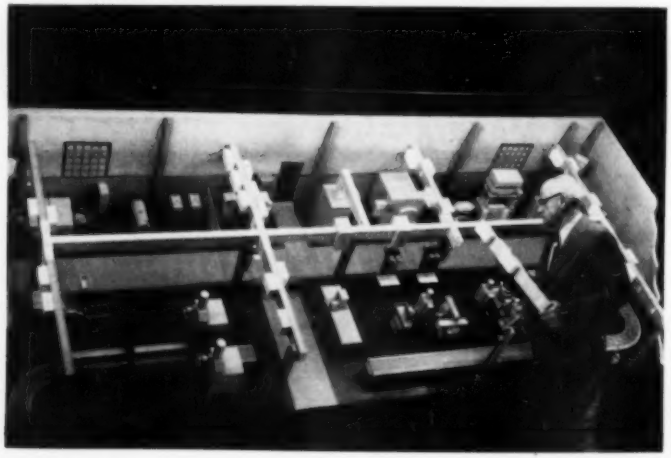
Chooses Bus Duct

The system starts with a 2000-amp circuit-breaker cubicle at the service entrance. This is provided as an overcurrent protective device and a disconnect for the plant's power distribution system. Mr. Wagoner chooses a bus duct system for secondary power distribution for several reasons: its low initial cost; its ease of installation; its flexibility; and its salvageability. Low-impedance bus duct is used for the heavy main feeder; plug-in bus duct for short branch runs of light capacity over each load area. Low-impedance duct uses close-spaced interlaced conductors to reduce reactance and its resultant poor voltage regulation and power losses. The conductors in plug-in bus duct are spaced far enough apart to accommodate power take-off receptacles at one-foot intervals on opposite sides of the duct.

Low-impedance bus duct rated at 2000 amp is used between the main circuit breaker cubicle and a "T" junction in the center of the model plant's production area. This arrangement makes it possible to use 1000 amp low-impedance bus duct for feeders and thereby effect an appreciable savings in cost. Circuit-breaker cubicles are installed between the junction of each 1000-amp feeder and the "T." These serve as disconnects to sectionalize the system, as well as providing over-current protection.

From the 1000-amp low-impedance bus duct feeders, Mr. Wagoner installs short branch runs of plug-in bus duct over each load area. Plug-in

In Westinghouse Electric's "More Production Ahead" traveling exhibit J. L. Wagoner uses a three-dimensional model factory and "lays out" a modern power distribution system. Exhibit will be in the Southeast from October 8 through November 5th. November issue of SP&I will carry the Southwestern schedule.



Southeastern Schedule

Oct. 8—Greensboro, N. C.
Oct. 10—Columbia, S. C.
Oct. 12—Savannah, Ga.
Oct. 15—Jacksonville, Fla.
Oct. 18—Miami, Fla.
Oct. 22—Tampa, Fla.
Oct. 25—Mobile, Ala.
Oct. 29—Columbus, Ga.
Oct. 31—Birmingham, Ala.
Nov. 2—Chattanooga, Tenn.
Nov. 5—Nashville, Tenn.

FUTURE EVENTS

Of Engineering Interest

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, C. E. Davies, Sec'y, 29 West 39th St., New York, N. Y.
Oct. 11-12, Fuels and AIME Coal Divisions Joint Conference, Hotel Roanoke, Roanoke, Va.
Nov. 25-30, Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, R. G. Macdonald, Sec'y, 122 East 42nd St., New York, N. Y.
Oct. 15-18, Engineering Division, 6th Annual Conference, General Oglethorpe Hotel, Savannah, Ga.

AMERICAN SOCIETY FOR METALS, W. H. Eisenman, Sec'y, 7301 Euclid Ave., Cleveland 2, Ohio.
Oct. 15-19, National Metal Congress and Exposition; World Metallurgical Congress, Detroit, Mich.

AMERICAN CHEMICAL SOCIETY and THE SOUTHERN ASSOCIATION OF SCIENCE AND INDUSTRY, H. M. Conway, Jr., Director, SASI, 5009 Peachtree Road, Atlanta, Ga.
Oct. 18-20, Southwide Chemical Conference, Wilson Dam, Alabama.

COASTAL ENGINEERING CONFERENCE, Charles E. Balleisen, Conference Sec'y, c/o Southwest Research Institute, 8500 Culebra Road, San Antonio 6, Texas.
Nov. 7-10, Second Conference on Coastal Engineering, Rice Hotel, Houston, Tex.

AMERICAN CHEMICAL SOCIETY EXPOSITION, Charles F. Roth, Mgr., International Exposition Co., Grand Central Palace, New York 17, N. Y.
Nov. 26-Dec. 1, 23rd Exposition of Chemical Industries, Grand Central Palace, New York, N. Y.

PLANT MAINTENANCE SHOW, Clapp & Poliak, Inc., 341 Madison Ave., New York, N. Y.
Jan. 14-17, 1952, Industrial Exposition, Convention Hall, Philadelphia, Pa.

openings along this duct permit power to be taken-off at the points where it is needed.

"The big advantage of bus duct in such installations," Mr. Wagoner states, "is its extreme flexibility where circuit changes are to be made. New circuits can be easily added and old circuits quickly changed to new machine locations."

This model plant is serviced by a system that distributes power at 460 volts, 3 phase. This is highly desirable for motors and it permits the use of smaller, less expensive conductors and controllers. However, Mr. Wagoner adds, 460 volts is not desirable for lighting loads, water coolers, fans, soldering irons, and glue pots—all normally controlled from the lighting panelboards.

He then connects a power take-off unit to the bus duct distribution system, and in turn, connects to it a dry-type transformer and a lighting panelboard. This provides a 120/208-volt, 3-phase, 4-wire, solid-neutral system that provides extreme flexibility for the distribution of power to lighting and other low-voltage equipment normally controlled from the lighting panelboard. One hundred twenty volts is ideally suited for lighting; while 208 volts is used by many portable tools.

Mr. Wagoner reviews the four essential devices necessary for the protection and operation of motor branch circuits. These include: 1) over-current protection, to protect the motor and its controller against dangerous overloads and short-circuit conditions; 2) the disconnect; 3) the motor starter; and 4) the motor running and over-current protection to protect against running overloads.

The concluding portion of the "More Production Ahead" exhibit discusses capacitors for better power factor. Mr. Wagoner demonstrates the effect of adding capacitors to a plant's system. He points out that a small investment in capacitors may not only pay for itself in reduced power bills in a short period of time, but additional loads may be handled without adding new bus duct, new transformers, or incoming leads.

A Caterpillar tractor with bulldozer starts the big clean-up job in West Bottoms, Kansas City, Mo. Here the industrial area was hard-hit by the rampaging Missouri river.

Production As Usual

Within approximately three weeks after being inundated by the recent severe flood that swept the Missouri and Kansas river valleys, the majority of Kansas City industrial plants were back in operation.

To help open mud-clogged streets and haul away tons of debris, the Caterpillar Tractor Co. of Peoria, Ill., rushed eighteen Diesel tractors equipped with Traxcavators and bulldozers to the area. Other Caterpillar equipment, such as Diesel electric sets, were put to work providing

When you specify insulation, be sure that it carries this seal! Authorized by the Industrial Mineral Wool Institute, the certification label assures you that the product has passed stringent laboratory tests and meets requirements prescribed by the National Bureau of Standards.

Specify Baldwin-Hill insulation materials... Your guarantee of certified quality and reliability.

Insulating Cement
Rockwool Pipe Insulation
Rockwool Blankets

Baldwin-Hill

Baldwin-Hill Company
600 Breunig Ave., Trenton 2, N. J.

Three weeks after The Marley Co. plant was inundated by the severe flood, the company was producing cooling towers and mechanical equipment in this plant. The 8 ft of flood water did not reach executive and engineering offices.

emergency light and power in heavy industries.

Repair Depot

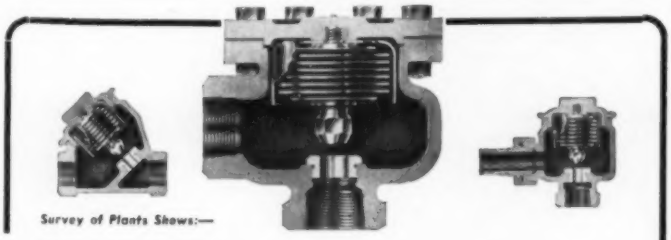
Westinghouse Electric Corporation set up an emergency repair depot in its huge jet-engine plant. C. G. Roush, manager of the Westinghouse Kansas City office, coordinated the company's emergency repair program bringing in specialists from Boston, Atlanta, Philadelphia, Denver, Pittsburgh, Chicago, Detroit, Cincinnati, Houston, St. Louis and Charlotte. To dry out motors and transformers and to bake on new insulating varnish when needed, Westinghouse built a special emergency oven 36 ft long, 12 ft high and 16 ft wide. The oven was heated to 240 F by steam pipes and electrical strip heaters.

Typical of the many emergency measures taken was the use of Chromalox radiant heaters at the Sealright Company, Inc., container manufacturers. Four Chromalox radiant heaters normally used to dry ink on cardboard were re-wired in series and allowed to dry themselves at a low heat. They were then installed in a temporary insulated plywood oven. An electric fan was used to circulate air in the oven, making it possible to hold the temperature constant at 200 F.

Operating continuously 24 hours a day, the oven dried 300 motors (75 per cent of the plant's total) and various other equipment in little more than two weeks. After that, the adaptable radiant heaters were easily and quickly returned to their former occupation.

The Homestead Valve Manufacturing Company of Coraopolis, Penna., shipped 150 Hypressure Jenny Steam Cleaners into the Kansas City area to help clean and disinfect mud-fouled and water damaged property and equipment. Note the high water mark on this factory wall.

This discouraging sight greeted Caterpillar Tractor Company's parts depot personnel as they returned to begin the task of cleaning up and restoring operations. During the flood, 20-in. of mud and 20 ft of water covered the entire warehouse, but finished machine parts, such as this idler pinion gear, were fully protected by Nox-Rust, a rust-preventive compound.

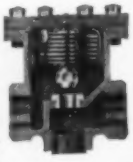


Survey of Plants Shows:—

15 of 20 Engineers Prefer Nicholson Traps

To determine the best steam trap on which to standardize, a large processing firm recently asked their plant engineers for their preference. In 15 out of 20 plants the choice was Nicholson.

The repeated adoption of Nicholson steam traps in plants currently in big "cost-reduction-through-modernization" programs is another indication of their advanced features. To learn why an increasing number of leading plants are standardizing on Nicholson thermostatic steam traps send for our catalog. 5 types for every power, heat, process use; size ¼" to 2"; press. to 225 lbs.



Catalog 751 or see Sweet's

W. H. NICHOLSON & CO. 175 OREGON STREET WILKES-BARRE, PA.

B & W—Miss., Del., Texas and North Carolina Expansions

Expanded use of subcontracted facilities, plus plans for a new plant, have been made in recent weeks by The Babcock & Wilcox Company, C. H. Gay, vice president, has an-

nounced. The facilities will add to the company's regular force of 14,000 a possible 1,900 employees.

The reason for the expansion, Mr. Gay explained, was to have available necessary additional fabricating operations to speed production of badly needed boiler parts when anticipated increases in steel and other materials for this work become available during the fourth quarter of the year.

"Most of America's power is produced by steam," Mr. Gay said. "Under previously existing plans we were unable to get sufficient supplies of steel, despite DO priority ratings, thus greatly hampering shipments of boilers to utilities and other industries endeavoring to expand power production. Under the new Controlled Materials Plan, which went into effect July 1, we hope to get more adequate supplies and need the added fabricating facilities to catch up on our shipping schedules."

The facilities to be used on a subcontracting, or lease basis, are at WILMINGTON, DEL.; WILMINGTON, N. C., and DALLAS, TEXAS. The new plant will be located at WEST POINT, MISS., Mr. Gay said. The company presently has six plants located in Barberton and Alliance, Ohio; Beaver Falls, Pa., and AUGUSTA, GA.

Southern Plant Expansion Notes

The C. LEE COOK MANUFACTURING CO., INC., LOUISVILLE, KY., plans expansion of its production facilities to meet demand for its metallic rod packings and graphitic iron piston rings. It is expected that the program will be completed within the next several months and that present capacity will be increased approximately 50 per cent.

A new research electrical well services research laboratory for HALLIBURTON OIL WELL CEMENTING COMPANY, DUNCAN, OKLA., has been completed in HOUSTON, TEXAS, by THE H. K. FERGUSON COMPANY, industrial engineers and builders. Facilities include 12 laboratory-offices, library, conference room, inspection room, and drafting room. The building is completely air conditioned.

The world's largest single unit for manufacture of Ethylene, being built for GULF OIL CORPORATION at PORT ARTHUR, TEXAS, by THE LUMMUS COMPANY of New York, will employ WORTHINGTON centrifugal compressors, driven by Worthington steam turbines, and a turbo gas expander to be used for recovery of temperature from product to battery limits.

1,000 Packing Problems with 1 Solution...

BELMONT
SHEET PACKINGS

Yes, regardless of the problem—whether it's temperatures encountered; pressures to be sealed; unique resiliency requirements to be met; abrasive resistance to be overcome or tensile strength and toughness specifications to be lived up to—as long as you have flange and parallel surface joints to connect, you'll always find the most satisfactory sealing answer in Belmont Sheet Packings.

Standard Belmont Sheet Packings are obtainable in sheets or rolls (according to style). The constructions include — compressed asbestos, asbestos metallic, red rubber, cloth inserted, vegetable fibre and a wide range of other basic materials and combinations, all scientifically formulated to provide BETTER SEALING.

For permanent joints or joints that must be taken apart frequently . . . for pliability . . . for compressibility . . . for the packings that will not creep or blow, try Belmont —the sheet packings made for every conceivable type of service—Distributors in every large industrial center are at your service.

For engineering or technical help on special jobs, write direct.

Catalog #40 is available, write for it.

CUT YOUR OWN GASKETS
WITH BELMONT GASKET CUTTER

A portable tool for cutting 1¼" dia. to 19" dia. circular gaskets from all kinds of soft sheet packings. Rigid and simple to operate. Larger sizes only requires cutter bar replacement. 44-3

THE BELMONT PACKING AND RUBBER CO.
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THERE'S A BELMONT PACKING FOR EVERY SERVICE

RINGS • SPIRALS • COILS • REELS
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FOR STEAM • WATER • OIL • GAS • AIR • ACIDS • ALKALIES • AMMONIA

BIDDLE

NUMBER 5 OF A SERIES

Instrument News

ARE YOU SURE OF PROTECTION THROUGH YOUR GROUND CONNECTIONS?

Biddle Ground Tester measures low resistance

Photo Courtesy Copperweld Co.

In spite of apparently good lightning rod or arrester protection, lightning frequently will cause severe damage if high ground resistance hampers its dissipation in the earth. Lightning storms are prevalent in the northeastern states during the spring and fall months. Plants in this section should make a thorough round of ground resistance tests. Aside from the hazards to personnel, thousands of dollars may be saved in damage to electrical equipment and in loss of power and stoppage of production.

The MEGGER® Ground Tester is the easiest, quickest and most accurate method of determining ground resistance. It is an instrument specially designed for the purpose and should be used wherever possible. Direct readings are automatically obtained in ohms. It provides its own source of current—no batteries, or other remote source required. It's easy to carry, too. Has approval of the Associated Factory Mutual Insurance Companies.

Don't put it off—write today for "Grounding Electrical Circuits Effectively" by J.R. Eaton (Bulletin 25T2-SP) and our Biddle manual on "Ground Resistance Testing" (Bulletin 25J-SP).

HERE'S A "GOOD COMPANIONS" KIT FOR PRACTICAL ELECTRICAL ENGINEERS AND MAINTENANCE MEN

Men concerned with all-around-the-plant electrical tests and resistance measurements tell us that these are "indispensable" tools:

Midget Megger Electrical Insulation Tester for detecting dirt, moisture and deterioration in advance of failure, or as a trouble-shooter after failures occur.

The Midget Megger Circuit Testing Ohmmeter for measuring conductor resistance of coils, contacts and relays, and checking continuity of circuit and grounded parts.

Be sure to write for your copy of our new Bulletin 21-85-SP today.

JAMES G. BIDDLE CO.
1316 Arch St., Philadelphia 7, Pa.

Please mail me ☐ Bulletin 25T2-SP
☐ Bulletin 25J-SP ☐ Bulletin 21-85-SP.
Thank you.

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ELECTRICAL TESTING • SPEED MEASURING INSTRUMENTS • LABORATORY & SCIENTIFIC EQUIPMENT

DeVilbiss Promotes Spruce

W. C. SPRUCE, direct factory representative of the DEVILBISS COMPANY'S spray painting and finishing equipment division, has been promoted to Southwest District Manager.

Mr. Spruce will continue to maintain offices at the company's branch, 1515 Dragon St., DALLAS, TEX. In his new position, he will supervise the company's sales activities in the newly created Southwest District.

Conoflow—Houston

CONOFLOW CORPORATION, 2100 Arch St., Philadelphia, has announced extension of the company's field service to embrace HOUSTON, TEXAS.

N. N. AITKEN COMPANY — long established sales engineers for gas, oil, and chemical equipment—will represent Conoflow in Houston and the surrounding trading area extending from Freeport to Lake Charles, Louisiana. The company is located at 5960 Kansas Street in Houston.

Day-Brite—Southeast

CECIL L. CANNON, formerly Manager of Lighting Sales for Graybar Electric Company in Atlanta, has joined OREN M. RUFF to form the firm to RUFF AND CANNON. They will be located at 152 Nassau Street in ATLANTA and represent DAY-BRITE LIGHTING, INC. in GEORGIA, ALABAMA and EAST TENNESSEE.

Cleco—Richmond

THE CLECO DIVISION of the REED ROLLER BIT COMPANY, HOUSTON, TEXAS, has announced the appointment of HIGHWAY MACHINERY & SUPPLY CO., INC., 1724 Altamont Avenue, RICHMOND 21, VIRGINIA, as distributor for Cleco products in their area.

Cleco manufactures the Cleco and Dallett lines of air tools and accessories—including tools for construction, manufacturing, metal fabrication, foundries, industrial maintenance and stone carving.

National Radiator—Atlanta

BENGT O. STROMQUIST is now the GEORGIA-ALABAMA sales representative for boilers, radiators and heating accessories of THE NATIONAL RADIATOR CO., Johnstown, Pa. Mr. Stromquist's office is at 231 Healey Bldg., Atlanta 3, Ga.

H. K. Porter—Tulsa

L. L. GARBER, Vice President, H. K. PORTER COMPANY, INC., has been appointed General Manager of the Company's HINDERLITER TOOL COMPANY

"We are adding thousands upon thousands . . ."

FRANK M. FOLSOM
President, Radio Corporation of America

"By a simple person-to-person canvass, we are adding thousands upon thousands of serious savers to our Payroll Savings Plan. Our employees are eager to contribute to the strengthening of America's defenses while they build their own security. They know that individual saving initiative means a blow at ruinous inflation. They know that is the line on which all of us at home can make our strongest fight."

"Thirty days has September." And every one of these September days is a D Day. In newspapers . . . magazines . . . over the radio . . . from the television screen . . . on billboards . . . contributed advertising will urge every American to "Make today your D Day. Buy U.S. Defense Bonds."

September days are "D" Days for management, too —*Decision Days.*

If you have a Payroll Savings Plan and your employee participation is less than 50% . . . or if you have not made a person-to-person canvass recently—consider this *your* "D" Day.

Phone, wire or write to Savings Bond Division, U. S. Treasury Department, Suite 700, Washington Building, Washington, D. C. Your State Director will show you how easy it is to increase your employee participation to 70%, 80%—even 90%—by a simple person-to-person canvass that places an application blank in the hands of every employee. He will furnish you with application blanks, promotional material, practical suggestions and all the personal assistance you may desire.

Your employees, like those of the Radio Corporation of America and many other companies will join by the hundreds or thousands because they, too, are eager to contribute to the strengthening of America's defenses while they build their own security. Make it very easy for them—through the automatic Payroll Savings Plan.

The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

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300 LB.
Trouble Free Unions
for Tough Jobs

JEFFERSON Unions are made of Air Furnace Malleable Iron of an average tensile strength of 55,000 p.s.i., with a yield point of 36,000 pounds and an elongation of 15% in two inches.

Our seat rings are cut from seamless drawn brass tubing, free from all casting defects—sound and uniform always.

They are accurately tapped at all times; are carefully air tested and inspected before shipment, and each and every one approved only if they meet our rigid standards of inspection.

Slightly Higher Priced
But more than worth it.

See these outstanding features—

★ A ground ball joint to give leak-proof service

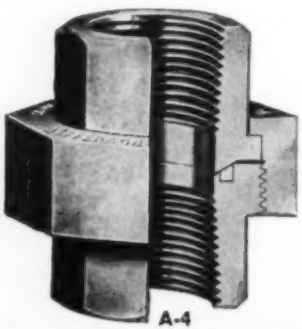
★ Octagonal with square corners fits any type of wrench

★ No gasket required, hence no maintenance problem

★ Hot-dip galvanized to Government Standard for corrosion resistance

Made in all thread sizes from ⅛" to 4" American Standard Taper Threads.

Also manufacture Excel 250 lbs and Master 150 lbs. All unions can be furnished with all-iron seats.



A-4

JEFFERSON
UNION CO.
650 WEST 26th St., NEW YORK 1.
79 GOODING ST., LOCKPORT, N.Y.
45 FLETCHER Ave., LEXINGTON, MASS.

DIVISION, TULSA, OKLAHOMA, producers of oil field well head equipment and lubricated plug valves.

Allis-Chalmers Promotions

Election of J. L. SINGLETON, vice president in charge of the general machinery division, and R. S. STEVENSON, vice president in charge of the tractor division, to the board of directors of the ALLIS-CHALMERS MANUFACTURING COMPANY was announced recently. They succeed as directors the late Walter Geist and W. C. Johnson. W. E. HAWKINSON, secretary and treasurer of the company, was named a vice president, secretary and treasurer.

Allis-Chalmers—Atlanta

After 50 years of service, L. A. WATTS has retired as manager of the service and erection section of ALLIS-CHALMERS general machinery division effective September 1.

C. B. SMITH, superintendent of service and erection of the ATLANTA district since 1941, has been named successor to Watts. He has been with Allis-Chalmers since 1929.

C. P. SUYKERBUYK, who has been attached to the Los Angeles district office as a special engineer since 1944, succeeds Smith at Atlanta.

LYON-Raymond Changes Name

The 111-year old LYON-RAYMOND CORPORATION, Greene, N. Y., manufacturers of electric industrial trucks and hydraulic elevating equipment, has changed its name to THE RAYMOND CORPORATION, effective Sept. 1, 1951, according to an announcement by George G. Raymond, Sr., President, and George G. Raymond, Jr., Executive Vice President, of the firm.

Reliance—Southeast

THE RELIANCE ELECTRIC & ENGINEERING COMPANY, Cleveland, Ohio, has announced the following additions to its staff: REX T. WILLARD, assigned to the company sales office at 427 Candler Bldg., ATLANTA, GA.; and CECIL D. WRIGHT, attached to the company's CHARLOTTE, N. C., office at 704 Liberty Life Bldg., as field service engineer.

Willard, who joined Reliance earlier this year, was graduated from North Carolina State College, Raleigh, N. C., in 1949. Wright formerly was an electrical engineer at the West Point Manufacturing Co., Langdale, Ala. He is a graduate of Alabama Polytechnic Institute, Auburn, Ala.

Hyster—Dallas

C. H. COLLIER, JR., eastern division sales manager for the HYSTER COMPANY, resigned August 15 to join his father's business firm, the C. H. COLLIER COMPANY of DALLAS, TEXAS, as a partner. Collier has been with Hyster since 1941.

Collier, who studied civil and petroleum engineering at the University of Texas, and Cornell, was a practicing engineer for 11 years before joining Hyster. He is a licensed civil and petroleum engineer in the State of Texas.

The C. H. Collier Company, Hyster dealers for the Southwest, recently expanded their facilities and now maintain complete facilities for sales parts and service of materials handling equipment.

Bennett Retires—Okonite

THE OKONITE COMPANY, Passaic, N. J., has announced the retirement of C. E. BENNETT from active participation in company affairs as manager of the OILOSTATIC DEPARTMENT. Mr. Bennett came to Okonite from the GEORGIA POWER COMPANY in 1930. He is succeeded by PAUL WHITE as manager of the Oilostatic Department, and GUY EVEREST as Oilostatic Engineer.

Speed Reducer For Steel Mill

THIS is the largest standard enclosed worm gear speed reducer ever built in the Trenton, N. J., shops of the De Laval Steam Turbine Company.

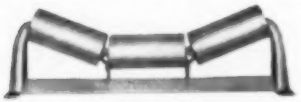
It is a 30-in. center distance unit transmitting 200 hp at 410 rpm with a ratio of 17 2/3 to 1. It will soon go in service on a Mesta slabbing mill installation in a major steel company.

NEW EQUIPMENT for Southern Industry

Free additional information is available to readers of Southern Power & Industry. Check item number on the postage free service coupon post card—page 17.

Belt Conveyor Idler

L-1 TRANSALL INCORPORATED, 109 North 11th St., Birmingham, Alabama, is now manufacturing a complete line of prelubricated belt conveyor idlers which require no further lubrication.



Transall's prelubricated belt conveyor idler.

Combination of contact sealed, high speed, heavy duty ball bearings and special mounting features work together to effectively exclude foreign material and retain bearing lubricant. This eliminates all lubrication cost, reduces fire hazard from grease collection, prevents grease injury to belt and prevents great contamination of product handled.

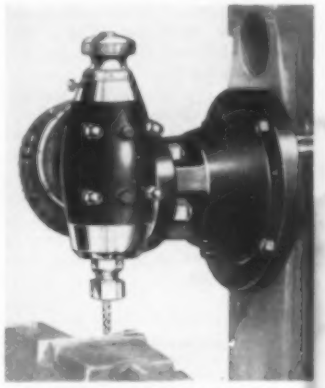
The special sealed-in lubricant operates with no appreciable change in viscosity from —90 F to 200 F, giving a practically constant idler friction factor throughout this temperature range. It melts at 376 F and is inhibited against oxidation, emulsification and saponification. These lubrication improvements result in an idler which may be almost universally applied regardless of operating temperatures.

Idler frame construction is all steel —jig welded. The result is an extremely rugged accurately aligned frame which insures uniform belt training under all loading conditions. Roll shafts are solid, extend completely through the idler roll and are mounted to eliminate all cantilever loading on the roll ends.

Milling Head

L-2 THE BROWN MILL TOOL CO., 5443 San Fernando Road West, Los Angeles 39, Calif., announces a new micrometer precision, vertical milling head, for angle boring and milling on horizontal milling machines.

The ground thread micrometer lead screw has a navy bronze stud for spindle end thrust support with set screw take-up adjustment. Adjustments are easily made with ordinary Allen wrench. The gear housing is of



Vertical milling head of the Brown Mill Tool Co. for angle boring and milling on horizontal milling machines.

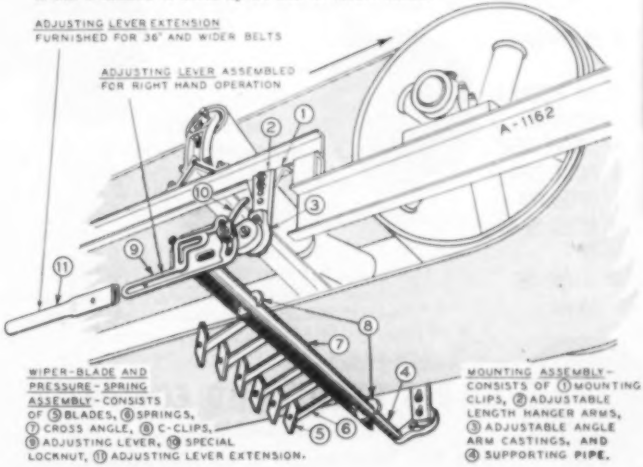
Conveyor Belt Cleaner

L-3 STEPHENS-ADAMSON MFG. CO., Aurora, Ill., is marketing a spring type conveyor belt cleaner.

Self aligning, spring steel wiper blades, set perpendicular to the belt surface, but diagonal to belt travel, wipe the belt clean and dry as it passes. Spring arms supporting the blades maintain a uniform pressure on the belt and allow blades to ride easily over obstructions such as belt splices. Dribble from the cleaner falls directly into the rear of the discharge chute at the head end of the conveyor.

Since the wiper has an independent mounting assembly, it can be easily adapted to fit existing conveyor installations. Adjustments and replacements can be made from either side without interrupting conveyor operation.

Stephens-Adamson belt cleaner mounted beneath return belt back of discharge pulley. Blades wipe off any material that adheres to the belt before it has a chance to build up on belt or return rollers.


ADJUSTING LEVER EXTENSION FURNISHED FOR 36" AND WIDER BELTS
ADJUSTING LEVER ASSEMBLED FOR RIGHT HAND OPERATION
A-1162
WIPER-BLADE AND PRESSURE-SPRING ASSEMBLY - CONSISTS OF ⑤ BLADES, ⑥ SPRINGS, ⑦ CROSS ANGLE, ⑧ C-CLIPS, ⑨ ADJUSTING LEVER, ⑩ SPECIAL LOCKNUT, ⑪ ADJUSTING LEVER EXTENSION.
MOUNTING ASSEMBLY - CONSISTS OF ① MOUNTING CLIPS, ② ADJUSTABLE LENGTH HANGER ARMS, ③ ADJUSTABLE ANGLE ARM CASTINGS, AND ④ SUPPORTING PIPE.

For more data circle item code number on the postage free post card—p. 17

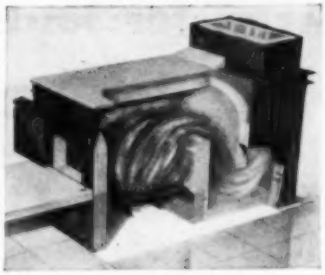
semi-steel, precision pre-loaded ball bearings throughout. Hardened and ground spiral and helical gears. Spindles are hardened and ground with two piece collet tightening nut.

Gear rating is 1½ to 15 hp, running in oil. Twenty-five models are available.

Rubbish Destructor

L-4 PLIBRICO JOINTLESS FIREBRICK CO., 1800 Kingsbury St., Chicago 14, Ill., is offering a newly designed rubbish destructor for dry waste, such as paper, cartons, floor sweepings, rags, wood scrap, and other rubbish readily combustible in nature.

The unit is erected in four standard sizes to meet the requirements of most industrial plants. Standardization reduces the cost of this incinerator by avoiding special engineering charges. This incinerator is especially designed for the rapid burning of dry rubbish. High furnace temperature is attained through the air-tight qualities of the monolithic refractory lining, also the efficient furnace design which features an elliptical curved arch to reflect and radiate the heat to the entire firebed. The deflecting arch behind the bridge wall provides the turbulence and long flame travel essential to complete and smokeless combustion.



Plibrico's rubbish destructor for dry waste.

The inclined grate allows the incinerator to be charged with a large volume of rubbish. The burning rate is controlled by opening or closing the ashpit doors which admit an ample supply of air for combustion. With light, dry rubbish which burns very rapidly, the large stack area avoids the dangerous annoyance of flame and smoke belching out of the charging doors when opened, and reduces gas velocity and minimizes the eruption of fly ash. A strong ladder is built into the stack.

Heat-Resistant Alloy

L-5 THE INTERNATIONAL NICKEL COMPANY, 67 Wall Street, New York 5, N. Y., has announced the development of an alloy for use under conditions of high temperature and corrosion.

The new alloy, trade-named "Incoloy," contains about 35 per cent nickel and 20 per cent chromium, with the balance iron. It is produced in most standard rolling mill forms, including sheet, strip, rod, wire and tubing. Alloy is designed for many purposes now served by some of the company's older alloys, which run up to more than 70 per cent nickel.

Expansive Bit

L-6 ROBERT H. CLARK COMPANY, 9330 Santa Monica Blvd., Beverly Hills, Calif., is manufacturing a new expansive bit, featuring a one-piece shank.

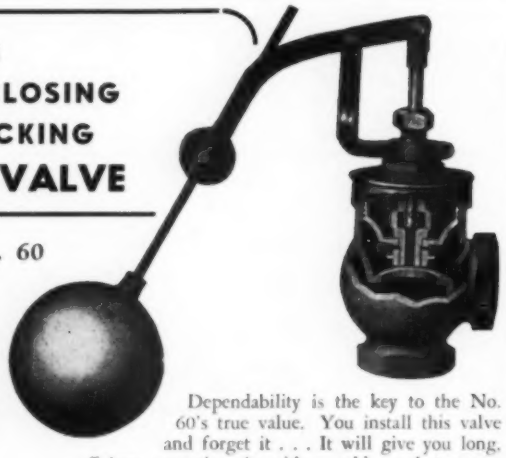
The tool cuts clean holes in hard or soft wood from 1/2 to 3-in. in diameter. According to the manufacturer, the specially engineered cutting blade requires less pressure, the steel blades hold their edge, are easily adjusted, and the positive lock prevents blade slippage. The self-cleaning lead screw is of the constant feed, no loading type.

Robert H. Clark Company's expansive bit featuring one-piece shank.

Here's a
TIGHT CLOSING NON-STICKING FLOAT VALVE

DAVIS No. 60

- RENEWABLE DISC
- NO INTERNAL PACKING
- SINGLE SEAT
- PILOT STEM OPERATED
- SIZES ½ to 12"
- GLOBE OR ANGLE



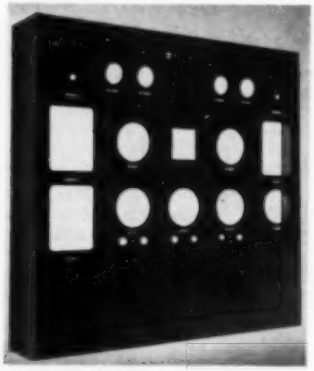
Dependability is the key to the No. 60's true value. You install this valve and forget it . . . It will give you long, efficient operation in either cold or hot water service. Pilot stem operation assures easy opening against any pressure up to 125 p.s.i. and absolutely drip-tight closing. No internal packing to cause excessive friction and sticking. Standard construction—composition disc, bronze trim. All bronze or stainless trim available. Contact your distributor or write.

DAVIS REGULATOR COMPANY
Established 1875
2508 So. Washtenaw Ave., Chicago 8, Ill.

Panelboards

L-7 FALSTROM COMPANY, Falstrom Court, Passaic, N. J., has developed a standard self-supporting instrument panelboard known as the Falstrom Deep Wing panel.

The structure is flexible and is designed to meet all specifications where it is required from lack of wall space for supports, or where double faced instrument boards and walk-in type cubicles are used.



Falstrom Company's self-supporting panelboard structures for double faced instrument boards, walk-in type cubicles or where wall space is limited.

The unit is made of completely formed steel, usually 3/16-in. to 1/4-in. in thickness, with return edges at top and bottom of 2-in. and side wings from 12-in. to 18-in. or wider for special purposes. These wings serve as support members and can also be used to mount terminal blocks and other electrical or mechanical equipment.

The Deep Wing panel makes it possible for control panels to be placed in the most advantageous locations. The operator can service the panel with a minimum of obstructions, and the wings afford protection for the control cases, instruments, wiring, and piping.

Deionizer

L-8 ELGIN SOFTENER CORPORATION, Elgin, Ill., has announced a new single tank deionizer of mixed-bed, monoflo design which gives up to 44 per cent more capacity and produces water of highest chemical purity, free from all ionizable impurities including carbon dioxide and silica.

The new unit is claimed to replace distillation or evaporation for as little

Perolin SINCE 1904

PEROLIN QUALITY

...backed by a half century of experience guarantees unexcelled service and performance

PEROLIN FUEL OIL TREATMENT
for Soot and Sludge

PEROLIN BOILER TREATMENT
for Scale and Corrosion Control

PERO-NITE
Soot and Fire Scale Remover

FORMET WATER TREATMENT
for Water Supply and Air-Conditioning Systems

PERO-KOTE TANK COATING
for Water Tanks

AND MANY OTHER MAINTENANCE PRODUCTS

The PEROLIN COMPANY, Inc.
Manufacturing Chemists since 1904
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Warehouse stocks in 21 conveniently located centers of the United States and Canada.
Write for name and address of nearest representative.

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as 1 per cent to 10 per cent of the cost and the equipment requires little space. The double-check design prevents loss of valuable ion-exchange resins.

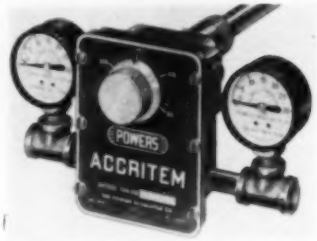
A single-tank unit replaces the complex two and four-column deionizers formerly used, and the new Ultra-Deionizer producers water of far greater chemical purity than that delivered by multiple-tank deionizers. Being a single-tank unit, it is lower in cost and requires a minimum of space.

In the past, deionizing has been used in boiler plants or for processes requiring relatively pure water. However, in this simplified, more economical, and improved form, the scope of the deionizer is broadened to include both high and low pressure boiler plants and many industrial processes where water of highest quality is desired. With the Elgin Ultra-DeIonizer high purity water suitable for use in high pressure boilers is readily obtained at very low cost.

A new Bulletin No. 512—6 pages—is available from the manufacturer, and describes the new Ultra-DeIonizer and gives engineering and technical data for the range of sizes included.

Temperature Regulator

L-9 THE POWERS REGULATOR COMPANY, 3400 Oakton St., Skokie, Ill., has announced an expansion stem type regulator used to maintain liquids or air at any temperature desired by controlling pneumatic or water operated diaphragm valves or dampers.



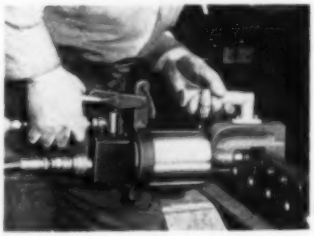
Powers Regulator Company's compressed air or water operated temperature regulator.

The instrument is applicable for instantaneous water heaters, heat exchangers, large capacity water storage heaters, jacket water for air compressors, diesel and gas engines, vats, dryers, dyeing and bleaching machines, dry bulb and new point control.

The device has adjustable sensitivity and overheat protection; calibrated dial temperature adjustment; temperature ranges 50-200 F and 150-350 F. It requires compressed air or water at 15 lb pressure. Small size regulator head is 2 ⅞ x 3 ⅝ in., sensitive bulb is 12 in. long with ½-in. I. P. S. connection. Sensitive element: Invar rod enclosed by a silver soldered copper bulb. Bulb wells of corrosion resistant metals are available.

Portable Riveter

L-10 THE MANCO MFG. CO., Bradley, Ill., has developed a new unit called the Guillotine Riveteer for driving rivets with hydraulic pressure.



Riveting by the Manco Riveteer utilizes a "squeezing" action rather than the customary hammering of the rivet head.

The unit delivers 60,000 lb thrust through the hydraulic ram and will drive 5/8-in. cold rivets. It is portable, and according to the manufacturer it is easy to operate and the entire riveting cycle takes but 2½ seconds. The operator merely presses the hand valve to actuate the ram. Release of the valve provides automatic retraction.

Among the advantages the manufacturer states that by the use of hydraulic pressure, full thrust is delivered over the entire stroke and no adjustment is needed between different length rivets as required on air-operated riveting equipment. The riveter may be obtained with a variety of portable pump units for actuating the hydraulic pressure, including electric and compressed air.

Experience

Fabrication and erection of steel for more than 25 power plants in every section of the country is Ingalls' record of accomplishment . . . a record which reflects the experience and skill of the nation's largest independent structural steel fabricator.

Phone, wire or write for technical help in solving your power plant construction problems.

Ingalls Iron Works Company
BIRMINGHAM, ALABAMA
SALES OFFICES: NEW YORK, CHICAGO, PITTSBURGH

Mortar Mix

L-11 LONGVIEW LIME CORPORATION, 1717 Second Ave. South, Birmingham, Alabama, announces that they are now completing erection of a new plant to manufacture masonry cement, which is better known as dry building mortar, or mortar mix.

The mortar mix plant is an addition to the company's Longview No. 2 Plant at Longview, Alabama. The product went on the market last month.

The formula for this new product was perfected by the Southern Research Institute of Birmingham. It will be a combination of lime, portland cement, water cooled and granulated slag, in addition to other desirable additives—all of which assures the light color which is desirable to the builder. The product is also very plastic, and will exceed specifications of the American Society for Testing Materials and the U. S. Bureau of Standards.

The product will be packed in extra-ply, heavy duty, valve type, kraft bags which contain 62½ lb (1 cu ft) each. Preparing the product for use involves only adding necessary sand and water. Shipping facilities are being arranged so the purchaser may have the new product in full carload lots, or as mixed shipment with other Longview Lime products as desired.

New Masking Method

L-12 W. H. BRADY COMPANY, 1602 E. Spring St., Chippewa Falls, Wis., has developed a low-cost method of masking products during various stages of production, by means of "Quik-Masks," self-adhesive, pre-cut masks and gaskets for application without moistening.

The manufacturer recommends them for masking name plates, dials, gauges, machined parts, holes, threads, engraved and embossed letters, plated and polished sections or any shaped surface. The product is said to provide positive low-cost protection during spray painting, cleaning, plating, machining, tumbling, sandblasting, buffing, and polishing operations.

The "QuikMasks" are made from "Scotch" brand pressure-sensitive masking tapes. They come pre-cut to the size and shape required, and are either mounted on cards, several masks to a card, or individually with each mask having its own folded liner on the adhesive side.

IS AIR COSTING YOU MONEY
Air cost money? You bet it does . . . hot air, stagnant air, disagreeable odors cost plenty in terms of employe efficiency and customer relationships.
Emerson-Electric
EXHAUST FANS
Emerson-Electric
AIR CIRCULATORS
TO HELP YOU SOLVE YOUR VENTILATION PROBLEMS . . .
in stores, offices and institutions, here are two authoritative catalogs. They include plans for effective fan installations, plus complete product information on dependable Emerson-Electric Exhaust Fans and Air Circulators.
Make air an asset, not a problem . . . write for these catalogs today! Both are yours with no obligation.
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Gasoline Fork Trucks

L-13 YALE & TOWNE MANUFACTURING COMPANY, Philadelphia Division, 11000 Roosevelt Blvd., Philadelphia 15, Pa., has announced a new series of gasoline fork trucks specifically designed for operation in and around highway motor trucks and freight cars.

Yale's Trucker series — forks elevate 54-in. before secondary channels rise to increase height.

Called the "Trucker" series, the new trucks combine low weight, low overall height, and high maneuverability for operation in close quarters. Available in capacities up to 2,000 lb, the truck is only 68-in. high when the telescopic lift is collapsed. In duplex models, the truck can elevate its forks 54-in. before the secondary channels rise to increase the height. All controls on the new fork truck are automotive type.

Adhesive Backed Felt Tape

L-14 PRODUCTS RESEARCH CO., 5426 San Fernando Road, Glendale 3, Calif., has announced a new reinforced felt tape with a pressure-sensitive adhesive back.

This new felt product, known as Kling Felt, does not require a paper or other separation material between layers and, as a consequence, can be applied very rapidly.

No paper or separation material between layers of Products Research Company's pressure-sensitive adhesive backed felt.

Uses for this new adhesive backed reinforced felt include rattle and squeak deadening; sealing against dust, wind, fumes and foreign materials; as a thermal insulator; for vibration and shock cushioning in fragile crating and on machinery; for scratch protection and many other protective applications. Finger pressure will make it stay put on overhead and vertical positions until forcibly removed.

Industrial Stokers

L-15 IRON FIREMAN MANUFACTURING COMPANY, 3170 West 106th, Cleveland, Ohio claims a material increase in overall combustion efficiency of its industrial stokers through development of automatic linkage of the fuel and air supply which keeps the air-fuel ratio in continuous balance.

Accurate metering of coal from bunker to boiler by means of the worm conveyor is synchronized with the accurate metering of air from fan to boiler by the company's Air Volumeter. Thus the correct air-fuel ratio is maintained regardless of varying load demands.

The unit can be adjusted for any speed between maximum and minimum and is not restricted to 3 or 4 pre-determined speeds. Operating rate of the stoker is determined by the position of the upper quandrant in the control panel. This may be connected

BOILER TUBE CO. OF AMERICA

Tube Stocks and Bending

BOILER TUBE CO. OF AMERICA
McKEES ROCKS, PA.
(Pittsburgh District)
PITTSBURGH CHICAGO
FRED S. RENAULD & CO., LOS ANGELES

Only Thorough Engineering and Adequate Sizing Can Give You Pritchard Quality!

New Pritchard Type "B" QUINTAIR*

Air Cooled
Heat Exchanger

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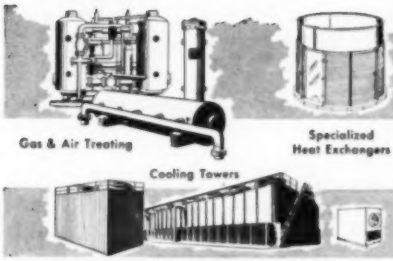

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Safely!

Plant power lines overloaded—right at a busy time when new wiring isn't feasible? Simply install Sprague Power Factor Capacitors at every piece of inductive electrical equipment. And *down* goes the amperage to a reasonable value! Sprague Capacitors will save you wiring, switch gear and transformer costs as they let existing circuits handle bigger loads for today's increased production schedules!

Free GUIDE

Write for Sprague's 28-page Power Factor Correction Guide replete with cost-saving suggestions and practical installation data.

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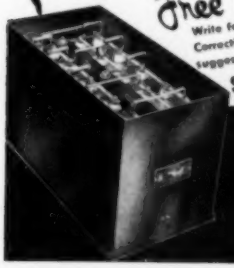
North Adams, Massachusetts



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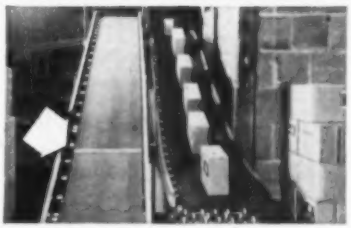
"on the spot"
POWER FACTOR
CAPACITORS

ALLIGATOR

CONVEYOR BELT LACING



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in Long Continuous Lengths for Conveyor Belts . . . . .

- ★ Excellent for Package Conveyors, Portable Loaders, Trenching and Ditching Machines, etc.
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directly to the power operator of a modulating combustion control or operated manually as well. When changes in the air-fuel ratio are required because of the changes in heating value or other characteristics of the coal used manual adjustment of the "air ratio" quandrant is all that is required.

Water Treatment

L-16 THE PERMUTIT COMPANY, 330 West 42nd Street, New York, N. Y., has developed a new kind of ion exchange unit for the treatment of water in steam heating plants.

The new unit, to be known as the "Dual Bed" Ion Exchanger, eliminates the need for much elaborate equipment and for handling dangerous chemicals during the regeneration process.

Principal application of the new unit is in industrial plants for the conditioning of boiler feedwater where the prevention of scale formation and reduction of condensate return line corrosion are major problems. An installation consists basically of a single tank.

It employs new type resins that are regenerated with plain salt. In addition to softening water, the new resins remove alkalinity and sulfates. The new unit differs from the company's previously announced mixed bed demineralizing unit although it employs the same resins. In the latter, the resins are mixed into a relatively homogeneous mass, whereas in the double bed unit they are held separately.

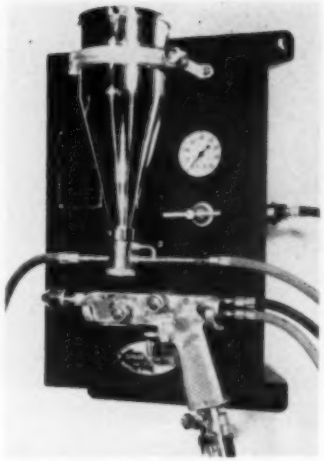
Metallizing Unit

L-17 WALL COLMONOY CORPORATION, 19345 John R St., Detroit 3, Mich., announces a new model of their Spraywelder powder metallizing unit for use with the Colmonoy Sprayweld Process.

This process consists of applying uniform overlays of hard facing alloys using metallizing procedures, and then bonding the overlay to the base metal.

The Spraywelder can also be used to apply metal powder castings such as copper, brass, stainless, aluminum, and zinc.

New features incorporated in the equipment are lighter weight, eye level air gauge, greater capacity air filter, new trigger mechanism, increased cooling chamber in head, and locked feed mechanism on carburetor.

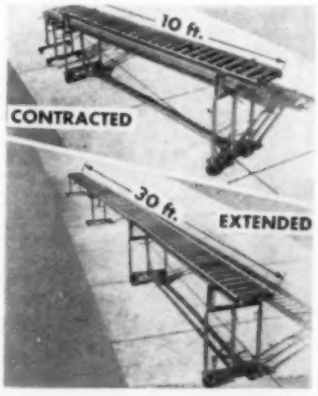


The Spraywelder, a powder metallizing unit of the Wall Colmonoy Corp.

Roller Type Conveyor

L-18 THE WILKIE COMPANY, 5520 Arch St., Philadelphia 39, Pa., is producing a new roller type conveyor designed especially for handling bundles and other objects not having a rigid, flat bottom.

The new conveyor is telescopic and is said to be easily pulled-out and pushed-in to follow the load for quick pick up and delivery. The unit is mounted on heavy casters. Its flexibility permits adaptation to numerous moving tasks. It can be used in a truck, trailer or freight car at shipping platforms.



The Wilkie Company's telescopic roller type conveyor.

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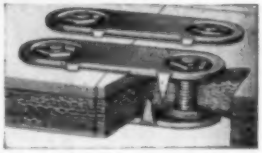
BELT FASTENERS and RIP PLATES

FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

★ FLEXCO Fasteners make tight butt joints of great strength and durability.
★ Trough naturally, operate smoothly through take-up pulleys.
★ Distribute strain uniformly.
★ Made of Steel, "Monel," "Everdur." Also "Promal" top plates.
★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.



Compression Grip distributes strain over whole plate area

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This is a glow switch condenserless precision starter equipped with automatic thermal relay circuit breaker. The relay automatically removes the lamp from the circuit electrically when the lamp becomes deactivated and automatically resets upon interruption of the lamp circuit.

SIMPLIFIES — Replacement of defective lamp automatically recycles starter circuit. No buttons to push — no replacement of starter.

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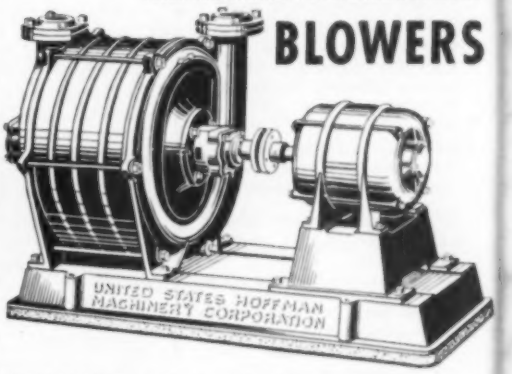

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new equipment (continued)

For more data circle item code number on the postage free post card—p. 17

New Cleaning Solvent

L-19 CURRAN ORDNANCE CHEMICAL LABORATORY, Lawrence, Mass., announces the development of a cleaning solvent which is said to possess high grease cleaning and carbon removing properties for cleaning carburetors, fuel pumps, Diesel injectors, pistons, oil strainers and metal parts.

The new product comprises a water emulsion floating top layer sealing a volatile chlor-aromatic solvent lower layer. Where chlorinated solvents cannot be obtained because of shortages, the new solvent may be used as a replacement in the present solvent distilling cleaning tanks.

Speed Measuring Instrument

L-20 JAMES G. BIDDLE CO., 1316 Arch St., Philadelphia 7, Pa., has announced the availability of the Dr. Horn centrifugal hand tachometer.

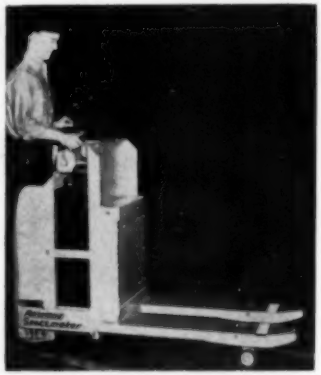
This new instrument is basically the same as the one previously offered. It has six ranges covering from 25,000 to 30,000 rpm in one instrument; is protected against damage from overspeeding; is simply constructed, and requires a minimum of maintenance.

Complete details are available in the manufacturer's Bulletin 35-65-26.

Dr. Horn tachometer of James G. Biddle Co. offers 6 ranges — 25 to 30,000 rpm.

Pallet Truck

L-21 LYON-RAYMOND CORPORATION, Greene, N. Y., has introduced a new rider-type, low-lift electric truck that handles both single and double face pallets.



Rider-type, low-lift electric truck of LYON-Raymond Corporation handles both single and double face pallets.

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creates the first impression in the mind of the buyer—the impression of prestige and quality which frequently requires years of service and salesmanship to build.
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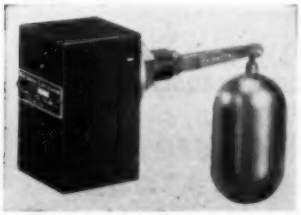
Known as the SpaceMaker Low-Lift, the new truck was designed to speed up handling by enabling the operator to ride while picking up and delivering unit loads. The truck travels up to 5 mph, carrying 4000 lb loads, and up to 6 mph when empty.

It can right angle pick up or spot loads from aisles 6 ft wide. This maneuverability and its light weight enable it to be used in low-capacity elevators, on lighter capacity floors, as well as in trucks and other cramped areas.

The truck is being offered with a carrying frame 30 x 60 in. in length and 24, 27 or 30 in. in width. Overall length of power unit and riding areas combined is only 28 in.

Signal Switch

L-22 THE RELIANCE GAUGE COLUMN COMPANY, 5092 Carnegie Ave., Cleveland 3, Ohio, has announced a float-operated signal switch device or fuel cut-off designed to operate on pressures from vacuum to 450 lb.



Reliance Gauge Column Company's signal switch or fuel cut-off device.

Re-developed from signal switch device marketed first in 1948, the new unit, designated as Levalarm EA-10, is heavier and embodies improved construction features. As a signal switch it is used to set off warning signals such as bells, sirens or lights when liquid levels in small boilers or various types of tanks reach predetermined low or high points.

Can also be used as a fuel cut-off for low water. In conjunction with water columns the levalarm float lever is inserted into the alarm valve opening.

Strap Cutting Tool

L-23 ACME STEEL COMPANY, 2840 Archer Ave., Chicago, Ill., has recently introduced the E14A0 Strap Cutter, a light-weight tool designed to cut flat steel strapping up to ¾ x .035 in. with minimum effort.

Among features of the simple construction is a band guide which prevents straps from wedging sidewise between the blades. A flat lower blade permits easy insertion beneath tensioned straps on bales, bundles, and cartons.

Frame and blade are constructed from forged steel. Narrow span handles are curved to fit the grip of the operator. The tool measures 9½ in.. long and weighs one pound.

Acme Steel's new strap cutting tool.

Catalogs and Bulletins

(Continued from p. 18)

For more data circle item code number on the postage free post card—p. 17

B-10 **INSULATION**—A.I.A. File No. 27-B, 24 pages—"Foamglas Insulation for Piping and Process Equipment" discusses advantages of Foamglas, listing its properties, typical data for cold, intermediate, and hot applications, details for insulating tanks, ducts, removable covers and tank heads.—PITTSBURGH CORNING CORPORATION, 307 Fourth Ave., Pittsburgh 22, Pa.

B-11 **ASH HANDLING**—Booklet, "Answers to Your Questions on Ash and Fly-Ash Handling Systems"—gives information on both hydraulic and pneumatic ash and flyash handling systems. Includes schematic drawings of arrangements under specific conditions and diagrams of basic arrangements.—BEAUMONT BIRCH COMPANY, 1505 Race St., Philadelphia 2, Pa.

B-12 **ARCH CONNECTIONS**—Bulletin No. 651, 4 pages—"Open-Hearth Arch Connections" discusses simplification of fantail arch connections, open hearth arch problems and solutions. Illustrated.—GEO. P. REINTJES COMPANY, 2517-19 Jefferson St., Kansas City 6, Mo.

B-13 **STEAM PURIFIER**—Condensed Bulletin 100, 4 pages—Describes an internal type purifier designed to remove

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virtually 100 per cent entrainment from vapor, for installation inside steam drums, flash tanks, evaporators, packed towers, bubble-cap towers, deodorizers and stills. Illustrated.—V. D. ANDERSON COMPANY, Attn: Steam Specialty Division, 1935 West 96th St., Cleveland 2, Ohio.

B-14 ROTARY PUMPS—Bulletin WQ-50, 8 pages—Warren-Quimby Rotex Pumps are illustrated and described, including both sectional and exterior views, dimensions, selection chart, and specifications.—WARREN STEAM PUMP COMPANY, INC., Warren, Mass.

B-15 INDUSTRIAL MUSIC—Bulletin H-1(5)55, 12 pages—"Muzak in Industry" is an analysis of a survey "Music in War Plants" conducted by the War Production Board, Washington, D. C., covering applications and results.—MUZAK CORPORATION, 229 Fourth Ave., New York 3, N. Y.

B-16 PACKINGS AND SEALS—Bulletin, 4 pages—Illustrates and describes packings, seals and stuffing box tools, with suggestions on application and use.—DURAMETALLIC CORPORATION, 2104 Factory St., Kalamazoo 24F, Mich.

B-17 PACKAGED POWER—Bulletin GEA-5600, 24 pages—Outlines methods of obtaining "packaged" electrical power equipment for quick expansion at low cost and with a minimum of critical materials. Illustrated with applicational photographs and drawings.—GENERAL ELECTRIC COMPANY, Schenectady 5, N. Y.

B-18 INDUSTRIAL FLOORS—Catalog, 12 pages—Discusses engineering the installation of industrial floors to withstand moving and deadweight loads, shock and vibration, extremes of temperature, oils, greases, chemical and industrial wastes and other destructive agents.—FLASH-STONE COMPANY, INC., 30 E. Rittenhouse St., Philadelphia 44, Pa.

B-19 TRANSFORMER CONTROL—Bulletin No. 2015, 4 pages—Illustrates and describes control unit for banked secondary transformer systems, for application in factories and on construction jobs.—HEINEMANN ELECTRIC COMPANY, O.S.E. Dept., Trenton 2, N. J.

B-20 INDUSTRIAL TRUCK MAINTENANCE—Bulletin 2100, 16 pages—Covers the care and maintenance of industrial trucks; 51 illustrations show the steps to be taken in preventive maintenance and annual check-ups.—THE BAKER INDUSTRIAL TRUCK DIVISION of THE BAKER-RAULANG COMPANY, 1250 West 80th St., Cleveland 2, Ohio.

B-21 PREPARING ALUMINUM FOR SPOT WELDING—Booklet, 18 pages—Describes procedures for cleaning, deoxidizing, rinsing, and drying, to prepare aluminum for spot welding. Equipment is catalogued and illustrated.—OAKITE PRODUCTS, INC., 123A Thames St., New York 6, N. Y.

B-22 CONTROLLED VOLUME PUMPS—Bulletin No. 151, 24 pages—Discusses controlled volume pumping and includes data for selecting pumps for specific applications. Color charts show relative corrosion resistance of materials of construction to chemicals.—MILTON ROY COMPANY, 1260 East Mermaid Lane, Philadelphia 18, Pa.

B-23 STUD WELDING—Manual, 32 pages—Gives a step-by-step photographic explanation of "How to Stud Weld," including 14 photographs of the process. Describes equipment and accessories.—KSM PRODUCTS, INC., Engineering Dept., 6512 Park Ave., Merchantville, N. J.

B-24 STEAM TRAPS AND AIR TRAPS—Catalog, 12 pages—Covers steam traps and air traps; lists cast semi-steel and forged steel inverted bucket traps, compound steam traps, ball float air traps, Y-type strainers and internal check valves. Illustrated.—ARMSTRONG MACHINE WORKS, 213 Maple St., Three Rivers, Mich.

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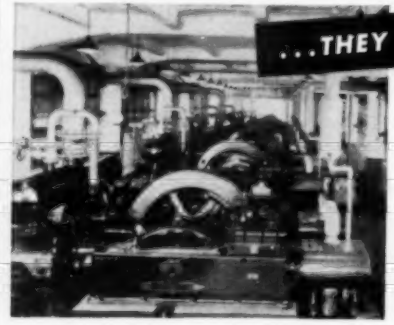

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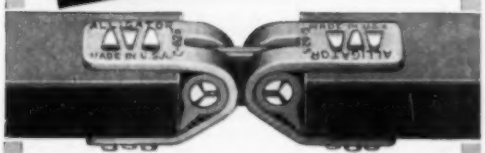

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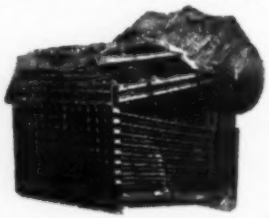

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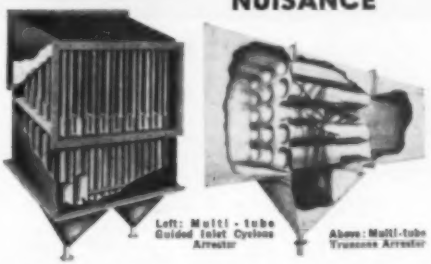

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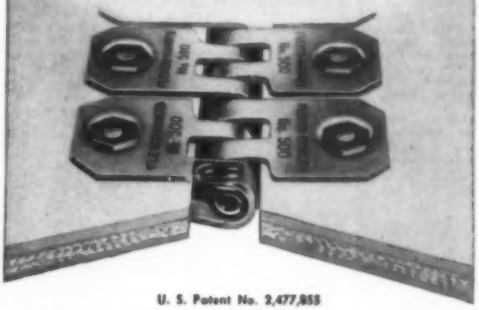

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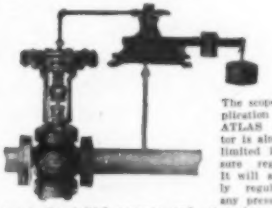

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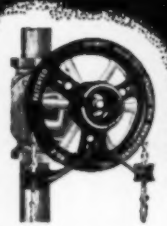

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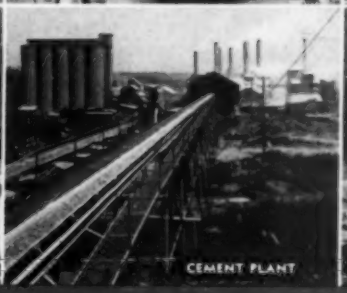
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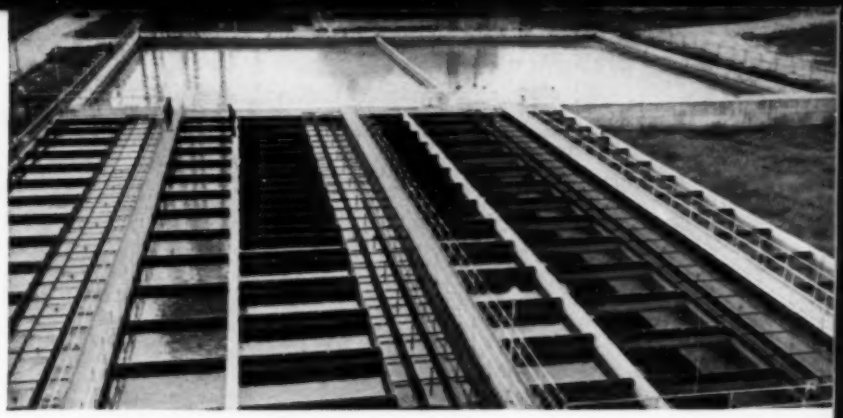

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